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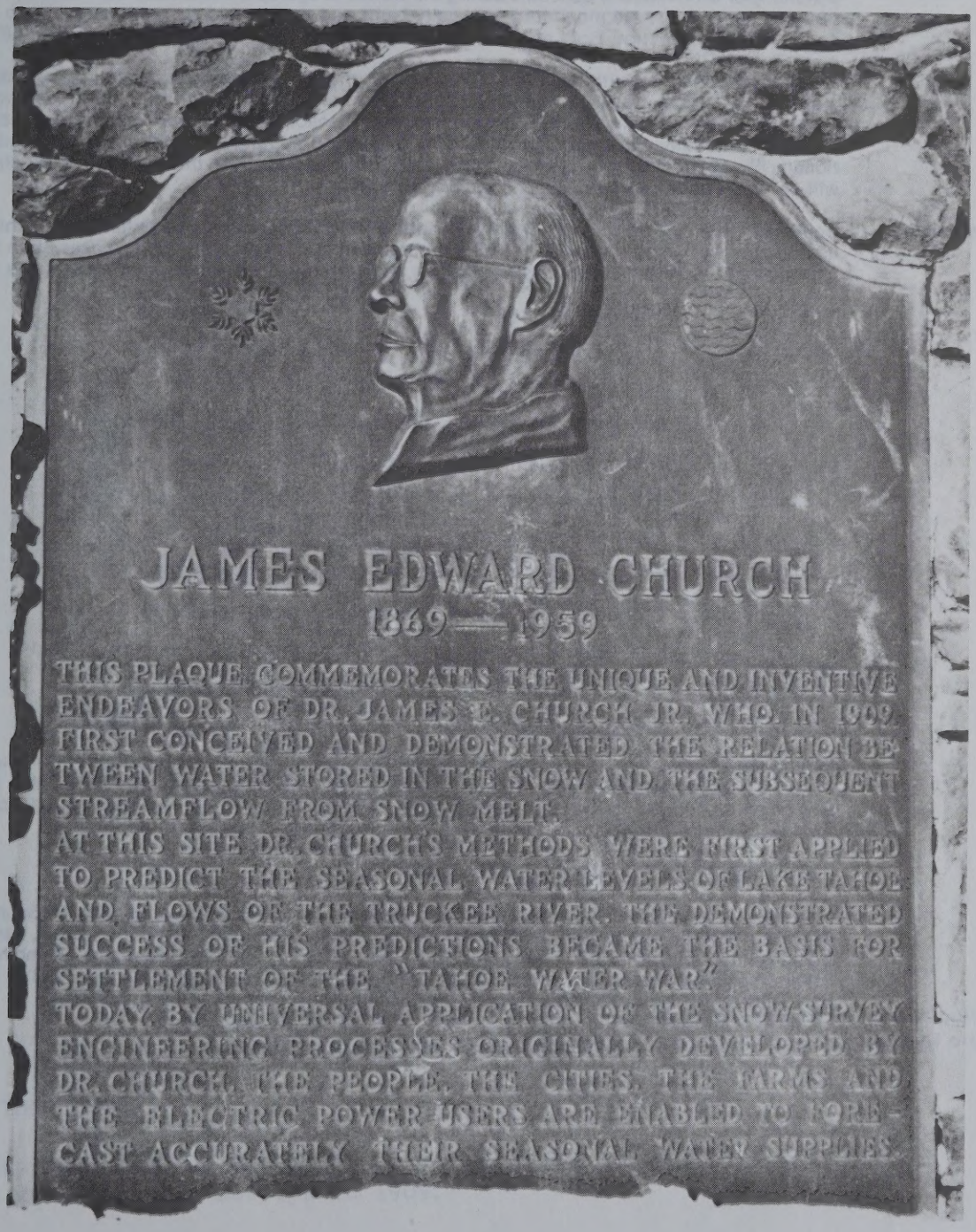
United States
Department of
Agriculture

Soil
Conservation
Service

Bozeman,
Montana

Montana
Water Supply Outlook

March 1, 1989


JAMES EDWARD CHURCH
1869 — 1959
THIS PLAQUE COMMEMORATES THE UNIQUE AND INVENTIVE
ENDEAVORS OF DR. JAMES E. CHURCH JR. WHO IN 1909
FIRST CONCEIVED AND DEMONSTRATED THE RELATION BE-
TWEEN WATER STORED IN THE SNOW AND THE SUBSEQUENT
STREAMFLOW FROM SNOW MELT.
AT THIS SITE DR. CHURCH'S METHODS WERE FIRST APPLIED
TO PREDICT THE SEASONAL WATER LEVELS OF LAKE TAHOE
AND FLOWS OF THE TRUCKEE RIVER. THE DEMONSTRATED
SUCCESS OF HIS PREDICTIONS BECAME THE BASIS FOR
SETTLEMENT OF THE "TAHOE WATER WAR."
TODAY, BY UNIVERSAL APPLICATION OF THE SNOW SURVEY
ENGINEERING PROCESSES ORIGINALLY DEVELOPED BY
DR. CHURCH, THE PEOPLE, THE CITIES, THE FARMS AND
THE ELECTRIC POWER USERS ARE ENABLED TO FORE-
CAST ACCURATELY THEIR SEASONAL WATER SUPPLIES.

Foreword

How Forecasts Are Made

Most of the annual streamflow in the Western United States originates as snowfall that has accumulated high in the mountains during winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Predictions are based on careful measurements of snow water equivalent at selected index points. Precipitation, temperature, soil moisture and antecedent streamflow data are combined with snowpack data to prepare runoff forecasts. Streamflow forecasts are coordinated by Soil Conservation Service and National Weather Service hydrologists. This report presents a comprehensive picture of water supply outlook conditions for areas dependent upon surface runoff. It includes selected streamflow forecasts, summarized snowpack and precipitation data, reservoir storage data, and narratives describing current conditions.

Snowpack data are obtained by using a combination of manual and automated measurement methods. Manual readings of snow depth and water equivalent are taken at locations called snow courses on a monthly or semi-monthly schedule during the winter. In addition, snow water equivalent, precipitation and temperature are monitored on a daily basis and transmitted via radio telemetry to central data collection facilities. Both monthly and daily data are used to project snowmelt runoff.

An error is associated with each forecast, and this error decreases as the season progresses and more data becomes available. To express the range of error that can be expected, "most probable" forecasts are issued along with a range representing a "reasonable minimum" and a "reasonable maximum". Actual streamflow can be expected to fall within this range in eight out of ten years. Additionally two specific scenarios are provided based on the assumption that subsequent precipitation will be "wet", above average, or "dry", below average.

For More Information

Copies of Monthly Water Supply Outlook Reports and other reports may be obtained from the states listed below. An annual snow survey data summary is published by the Soil Conservation Service for each of the western states. Historical snow survey data may be obtained at those same offices.

STATE	ADDRESS
Alaska	201 East 9th Ave., Suite 300, Anchorage, AK 99501-3687
Arizona	201 East Indianola Ave., Suite 200, Phoenix, AZ 85012
Colorado	2490 West 26th Ave., Building A, 3rd floor, Denver, CO 80211
Idaho	3244 Elder Street, Room 124, Boise, ID 83705
Montana	10 East Babcock, Room 443, Federal Building, Bozeman, MT 59715
Nevada	1201 Terminal Way, Room 219, Reno, NV 89502
New Mexico	517 Gold Ave. S.W., Room 3301, Albuquerque, NM 87102-3157
Oregon	1220 Southwest 3rd Ave., Room 1640, Portland, OR 97204
Utah	4402 Federal Building, 125 South State Street, Salt Lake City, UT 84147
Washington	W. 920 Riverside, Room 360, Spokane, WA 99201-1080
Wyoming	Federal Building, 100 "B" Street, Room 3124, Casper, WY 82601

In addition to state reports, a Water Supply Outlook for the Western United States is published by the Soil Conservation Service and National Weather Service monthly, January through May. Reports may be obtained from the Soil Conservation Service, West National Technical Center, 511 Northwest Broadway, Room 248, Portland, OR 97209-3489.

Water supply reports published by other agencies:

California — Snow Survey Branch, California Department of Water Resources, P.O. Box 388, Sacramento, CA 95802; British Columbia — The Ministry of Environment, Water Investigations Branch, Parliament Buildings, Victoria, British Columbia, V8V 1X5; Yukon Territory — Department of Indian and Northern Affairs, Northern Operations Branch, 200 Range Road, Whitehorse, Yukon Territory, Y1A3V1; Alberta, Environment Technical Services Division, 9820 106th St., Edmonton, Alberta T5K 2J6.

Montana
Water Supply Outlook

and

Federal - State - Private
Cooperative Snow Surveys

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Programs and assistance of the United States Department of Agriculture are available without regard to race, creed, color, sex, age, or national origin.

ON THE COVER:

This plaque on the outlet gate at Lake Tahoe, Nevada, commemorates the start of snow surveys in 1909.

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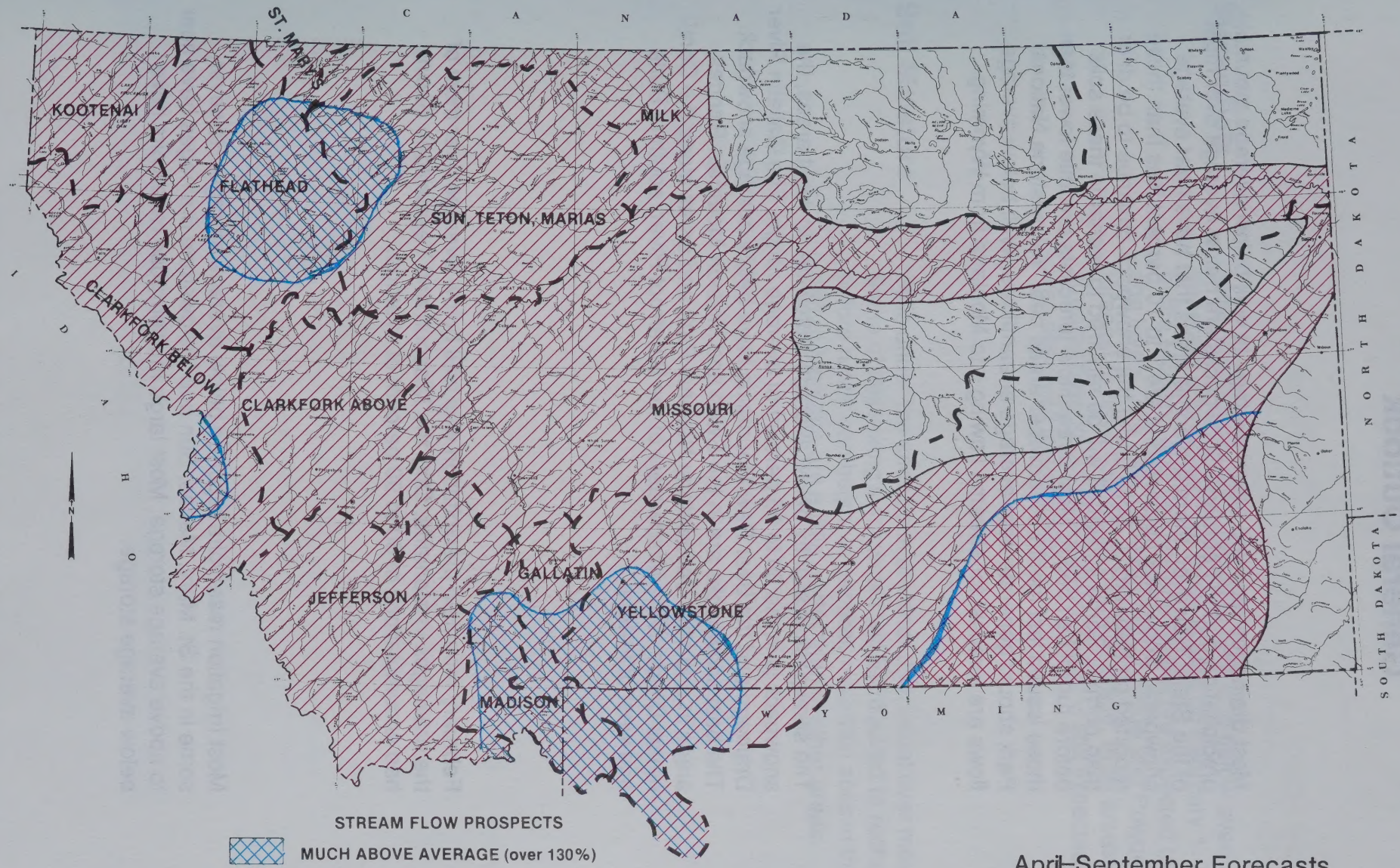
U.S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

STREAMFLOW PROSPECTS FOR MONTANA
Spring and Summer Period



STREAM FLOW PROSPECTS

- MUCH ABOVE AVERAGE (over 130%)
- ABOVE AVERAGE (110-130%)
- NEAR AVERAGE (90-110%)
- BELOW AVERAGE (70-90%)
- MUCH BELOW AVERAGE (below 70%)
- NOT FORECAST

April–September Forecasts

March 1, 1989

0 25 50 75 100 MI

0 50 100 150 KM

SOURCE:
Information provided by SCS Snow Survey Personnel.

JUNE 1985 4-R-39206

General Outlook

Summary

Most drainages received below average to well below average mountain precipitation during February. Snowpacks are below average over most of the State. However, there are some areas that have near average snowpack. Snowpack percentages are 5 to 10 percent less than those reported on February 1. Soils under the snowpack continue to be drier than normal. Some snowmelt will be required to recharge these soils before runoff can begin. Most streamflow forecasts are little lower than those issued last month. Headwater areas near Yellowstone National Park should generate near average streamflows. Well below average flows are forecast for streams flowing into Montana from Wyoming.

Snowpack

The snowpack is slightly below average statewide. In most areas, the snowpack is in the 80 to 95 percent of average range. The Gallatin River Drainage and the Bear Paw Mountains have below average snowpack. The best snowpacks are in the Swan and Mission Mountain Ranges, areas in and near Yellowstone National Park and areas along the Continental Divide in the headwaters of the Bitterroot River, south of Butte and west of Helena.

Precipitation

February mountain precipitation was well below average over most of the drainages in Montana. Only the Missouri and Yellowstone Basins had accumulations of 80 to 90 percent of average.

Reservoirs

Most irrigation reservoirs reported below average storage. However, some in the St. Mary, Marias, Sun and Yellowstone drainages have near to above average storage. Most large multipurpose reservoirs have below average storage.

Streamflow

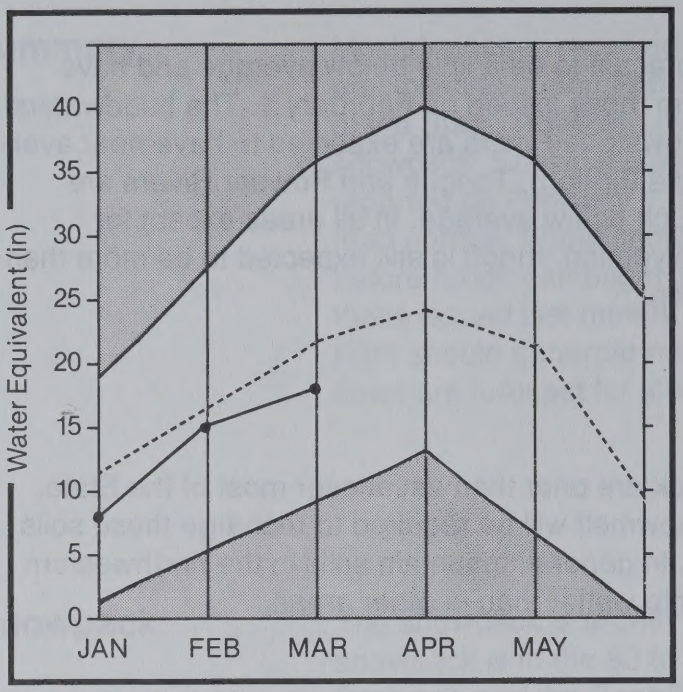
Most streamflows are forecast to be a little below average and have generally decreased from those issued on February 1. The headwaters of the Madison and Yellowstone Rivers are expected to have near average levels. The Milk, Little Bighorn, Tongue and Powder Rivers are forecast to have flow much below average. In all areas except for streams flowing out of Wyoming, runoff is still expected to be more than was observed last season.

Soil Moisture

Soils under the snowpack are drier than usual over most of the State. Some of this spring's snowmelt will be required to recharge these soils before runoff can begin. In general, mountain soils in the northwestern part of Montana are a little wetter than in other areas.

Kootenai Basin

Mountain snowpack* (inches)



*Kootenai in Montana

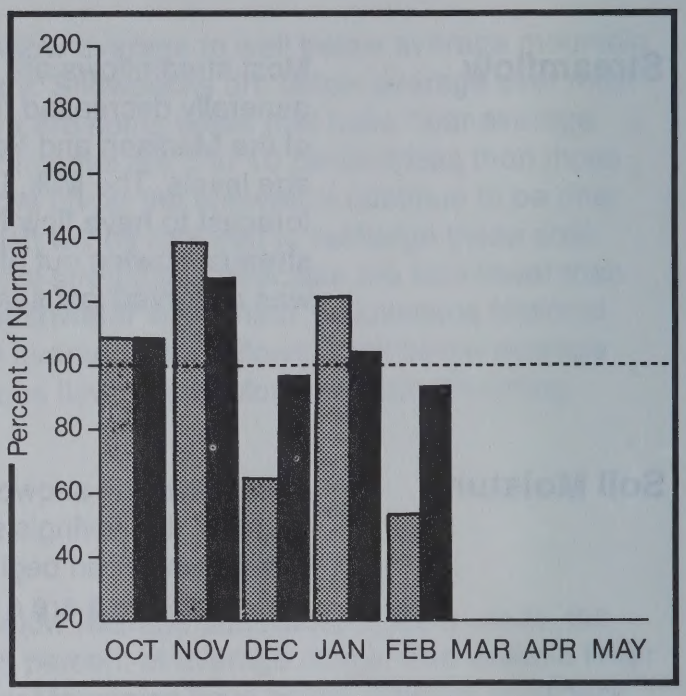
Maximum

Minimum

Average

Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation

Year to date precipitation

Water Supply Outlook

Mountain precipitation was well below average for February. This resulted in a small decrease in the basin-wide snowpack percentages since February 1. The snowpack on March 1 is below average in both British Columbia and Montana. Spring and summer streamflow is expected to be below average.

For more information contact your local Soil Conservation Service Office.

KOOTENAI RIVER BASIN in Montana

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	WET SUBS. (1000AF)	DRY SUBS. (1000AF)	REAS. MAX. (1000AF)	REAS. MIN. (1000AF)	25 YR. AVG. (1000AF)
KOOTENAI bl Libby Dam (2)	APR-JUL	5110	87			6290	3930	5885
	APR-SEP	5990	87			7370	4610	6903
FISHER nr Libby	APR-JUL	195	81	230	159	255	133	240
	APR-SEP	210	82	240	172	275	143	256
YAAK nr Troy	APR-JUL	385	78	445	325	515	255	494
	APR-SEP	410	79	460	365	545	275	517
KOOTENAI at Leonia (2)	APR-JUL	6470	88			7940	5000	7340
	APR-SEP	7440	88			9130	5750	8441

RESERVOIR STORAGE (1000AF)

RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.
LAKE KOOCANUSA	5748.0	1390.0	1393.0	1998.0

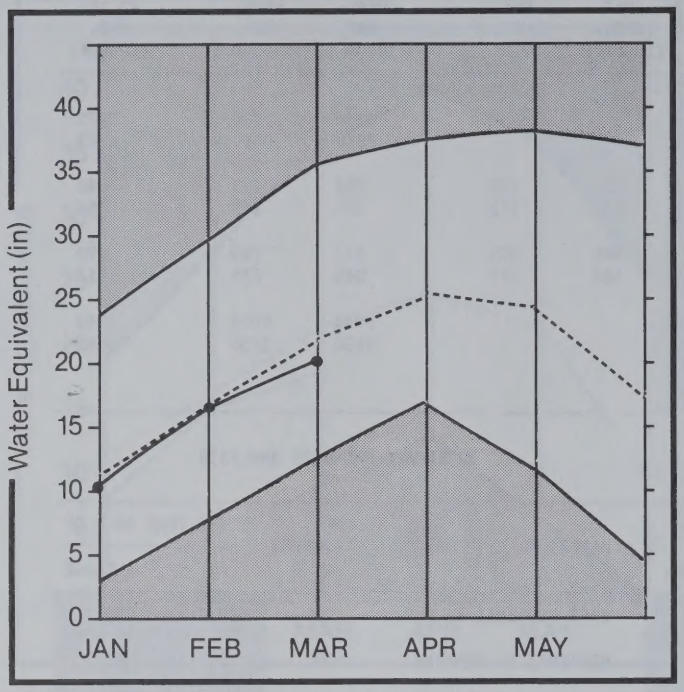
WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
EAST KOOTENAI in B.C.	28	137	95
KOOTENAI in MONTANA	31	136	81
KOOTENAI ab BONNERS FERRY	58	136	87

WET SUBS. and DRY SUBS. represent 150 and 50 percent subsequent precipitation events respectively.
REAS. MAX. and REAS. MIN. forecasts are for 10% and 90% exceedance levels with the exception of (1) below.
(1) - REAS. MAX. and REAS. MIN. forecasts are for 5% and 95% exceedance levels.
(2) - Corrected for upstream diversions or changes in reservoir storage.

Flathead Basin

Mountain snowpack* (inches)



*Flathead

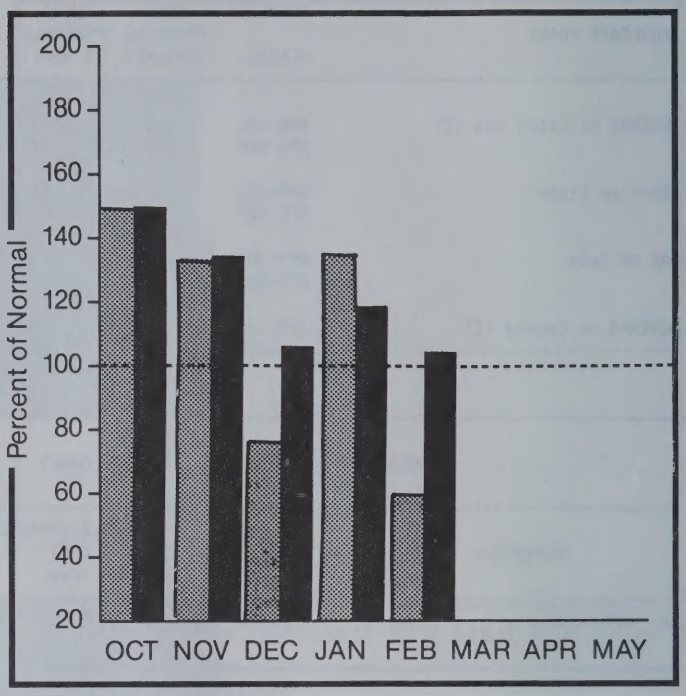
Maximum

Minimum

Average

Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation

Year to date precipitation

Water Supply Outlook

Mountain precipitation was about 60 percent of average for February. This decreased the mountain snowpack to below average in the more northern drainages. The Swan and Mission Mountains have snowpack near average. Spring and summer runoff is forecast to be 5 to 10 percent below average.

For more information contact your local Soil Conservation Service Office.

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	WET SUBS. (1000AF)	DRY SUBS. (1000AF)	REAS. MAX. (1000AF)	REAS. MIN. (1000AF)	25 YR. AVG. (1000AF)
NF FLATHEAD nr Columbia Falls	APR-JUL	1500	88	1640	1360	1770	1230	1701
	APR-SEP	1660	88	1770	1550	1960	1360	1880
MF FLATHEAD nr West Glacier	APR-JUL	1530	91	1650	1410	1800	1260	1680
	APR-SEP	1670	91	1800	1520	1960	1380	1836
SF FLATHEAD nr Columbia Falls (1)	APR-JUL	1960	93	2130	1770	2450	1470	2110
	APR-SEP	2080	93	2260	1900	2600	1560	2248
FLATHEAD at Columbia Falls (1)	APR-JUL	5130	91	5470	4680	6310	3950	5621
	APR-SEP	5580	91	5950	5150	6860	4300	6114
SWAN nr Bigfork	APR-JUL	580	97	610	550	675	485	597
	APR-SEP	655	96	680	620	765	545	683
FLATHEAD nr Polson (2)	APR-JUL	6110	93	6510	5710	7160	5060	6586
	APR-SEP	6640	93	7000	6210	7780	5500	7150

RESERVOIR STORAGE (1000AF)

RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.
CAMAS (4)	45.2	6.2	14.9	21.7
MISSION VALLEY (8)	100.0	21.8	28.2	38.4
HUNGRY HORSE	3451.0	1296.0	1400.0	2257.0
FLATHEAD LAKE	1791.0	774.0	889.0	901.0

WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
NORTH FORK FLATHEAD	16	148	89
MIDDLE FORK FLATHEAD	11	130	84
SOUTH FORK FLATHEAD	13	131	92
STILLWATER-WHITEFISH	9	145	87
SWAN	12	139	98
LITTLE BITTERROOT	7	138	80
FLATHEAD	48	139	90

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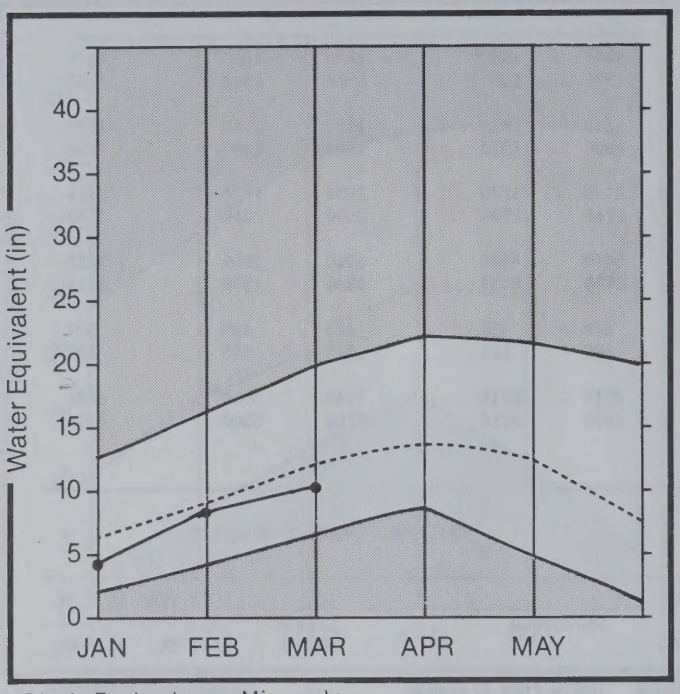
Clark Fork Basin above Missoula

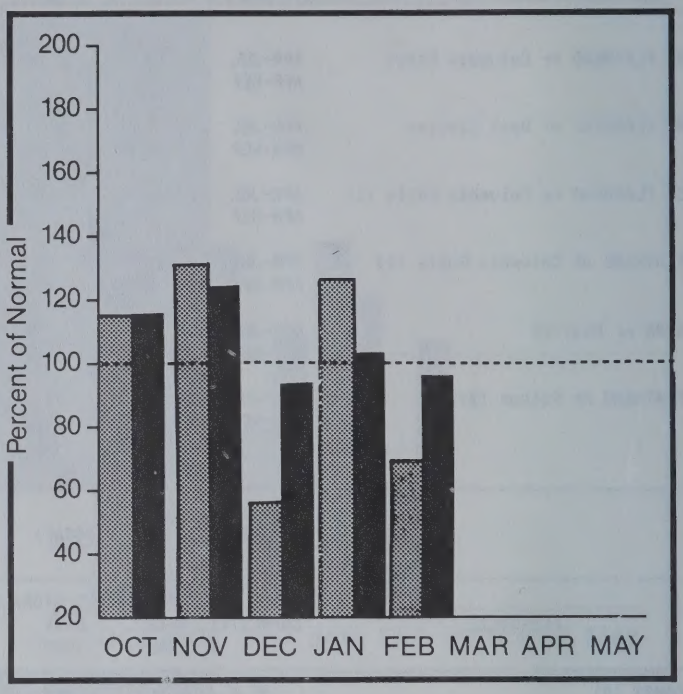
Mountain snowpack* (inches)



*Clark Fork above Missoula

Maximum
Minimum
Average
Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation
Year to date precipitation

Water Supply Outlook

Mountain precipitation was below average for February. The snowpack is now slightly below average in the Clark Fork Headwaters and the Blackfoot River Drainage. Spring and summer runoff is forecast to be below average.

For more information contact your local Soil Conservation Service Office.

CLARK FORK RIVER BASIN above Missoula

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	WET SUBS. (1000AF)	DRY SUBS. (1000AF)	REAS. MAX. (1000AF)	REAS. MIN. (1000AF)	25 YR. AVG. (1000AF)
MOULTON RESERVOIR inflow (2)	APR-JUN	190	80	225	152	250	128	237
	APR-JUL	210	80	255	165	280	142	263
WARM SPRINGS CK nr Anaconda (2)	APR-JUL	30	77	35	25	40	19.9	39
	APR-SEP	37	76	43	32	50	24	49
FLINT CK nr Southern Cross (2)	APR-JUL	11.7	80	16.0	7.4	17.0	6.4	14.8
	APR-SEP	13.7	77	19.0	8.4	20	7.3	17.8
FLINT CK bl Boulder Ck (2)	APR-JUL	49	80	65	33	71	27	61
	APR-SEP	62	79	81	44	90	34	78
LOWER WILLOW CK RES inflow (2)	APR-JUL	12.7	85	17.9	7.3	18.1	7.3	14.9
	APR-SEP	14.1	89	19.0	9.2	19.8	8.4	15.8
MF ROCK CK nr Philipsburg	APR-JUL	60	87	70	51	78	42	69
	APR-SEP	66	86	77	58	86	46	77
NEVADA CK nr Finn	APR-JUL	16.8	80	21	11.8	24	9.2	21
	APR-SEP	18.1	82	23	12.8	26	10.2	22
BLACKFOOT nr Bonner	APR-JUL	795	91	910	680	935	655	874
	APR-SEP	880	91	985	775	1040	725	969
CLARK FORK ab Milltown (2)	APR-JUL	610	87	730	490	835	385	703
	APR-SEP	700	86	830	570	960	440	812
CLARK FORK ab Missoula	APR-JUL	1400	89	1640	1160	1810	990	1577
	APR-SEP	1580	89	1790	1330	2040	1120	1781

RESERVOIR STORAGE (1000AF)

RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.
GEORGETOWN LAKE	31.0	25.4	26.5	25.7
LOWER WILLOW CREEK	4.9	1.0	1.4	1.7
NEVADA CREEK	12.6	1.2	0.8	5.2

WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
CLARK FORK ab BLACKFOOT	43	116	85
BLACKFOOT	22	128	96
CLARK FORK ab MISSOULA	59	121	89

WET SUBS. and DRY SUBS. represent 150 and 50 percent subsequent precipitation events respectively.
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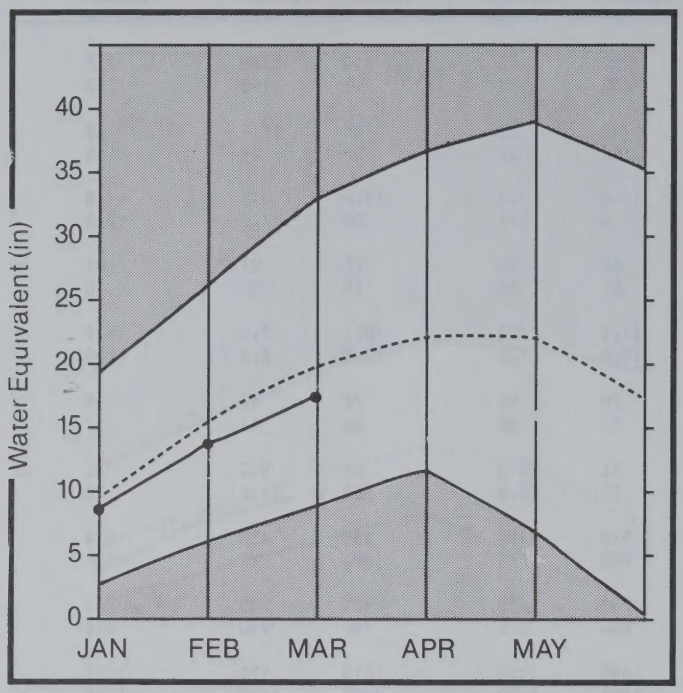
(2) - Corrected for upstream diversions or changes in reservoir storage.

Clark Fork Basin below Missoula

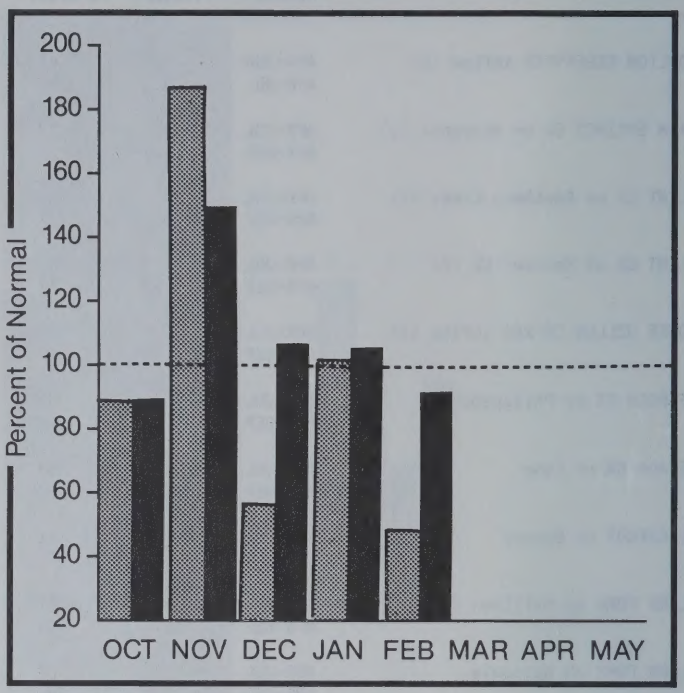
Mountain snowpack* (inches)



*Bitterroot

Maximum
Minimum
Average
Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation
Year to date precipitation

Water Supply Outlook

Mountain precipitation for February was about one-half of average. The snowpack percentages decreased about 10 percent during the month. The snowpack is below average on both the Bitterroot and Clark Fork River below Missoula. Streamflow is forecast to be 5 to 10 percent below average.

For more information contact your local Soil Conservation Service Office.

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	WET SUBS. (1000AF)	DRY SUBS. (1000AF)	REAS. MAX. (1000AF)	REAS. MIN. (1000AF)	25 YR. AVG. (1000AF)
CLARK FORK ab Missoula	APR-JUL	1400	89	1640	1160	1810	990	1577
	APR-SEP	1580	89	1790	1330	2040	1120	1781
WF BITTERROOT nr Conner (2)	APR-JUL	130	88	161	99	168	92	147
	APR-SEP	150	89	179	121	194	106	169
BITTERROOT nr Darby	APR-JUL	480	92	575	385	615	345	524
	APR-SEP	525	92	615	435	675	375	573
ROCK CK nr Darby	APR-SEP	78	93			93	63	84
SKALKAHO CK nr Hamilton	APR-JUL	41	89	48	35	48	34	46
	APR-SEP	47	87	55	41	56	38	54
BURNT FORK CK nr Stevensville (2)	APR-JUL	27	84	31	24	35	18.7	32
	APR-SEP	31	82	35	28	41	21	38
BITTERROOT at Missoula (2)	APR-JUL	1240	90	1380	1090	1580	885	1371
	APR-SEP	1350	90	1500	1200	1740	960	1497
CLARK FORK bl Missoula	APR-JUL	2640	90	2990	2290	3140	2110	2948
	APR-SEP	2920	89	3250	2560	3510	2330	3276
CLARK FORK at St. Regis	APR-JUL	3450	89			4700	2200	3894
	APR-SEP	3820	88			5200	2440	4325
CLARK FORK nr Plains (2)	APR-JUL	9640	89			12100	7250	10850
	APR-SEP	10600	89			13300	7980	11930
THOMPSON nr Thompson Falls	APR-JUL	170	77	190	150	225	117	222
	APR-SEP	195	78	215	178	255	135	250
PROSPECT CK at Thompson Falls	APR-JUL	102	80	111	93	135	69	128
	APR-SEP	111	81	118	104	147	75	137
CLARK FORK at Whitehorse Rapids (2)	APR-JUL	10700	88			13500	7910	12150
	APR-SEP	11800	88			14900	8720	13370

RESERVOIR STORAGE (1000AF)

RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.
PAINTED ROCKS LAKE	31.7	0.0	0.0	14.7
NOXON RAPIDS	335.0	260.5	321.6	297.6
COMO	34.9	10.9	5.7	13.4

WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
CLARK FORK ab MISSOULA	59	121	89
BITTERROOT	24	108	87
LWR CLARK FK bl MISSOULA	23	124	82
BITTERROOT & LWR C.F.	45	116	84
CLARK FORK TOTAL	99	119	86
FLATHEAD	47	139	91
PEND OREILLE	140	125	87

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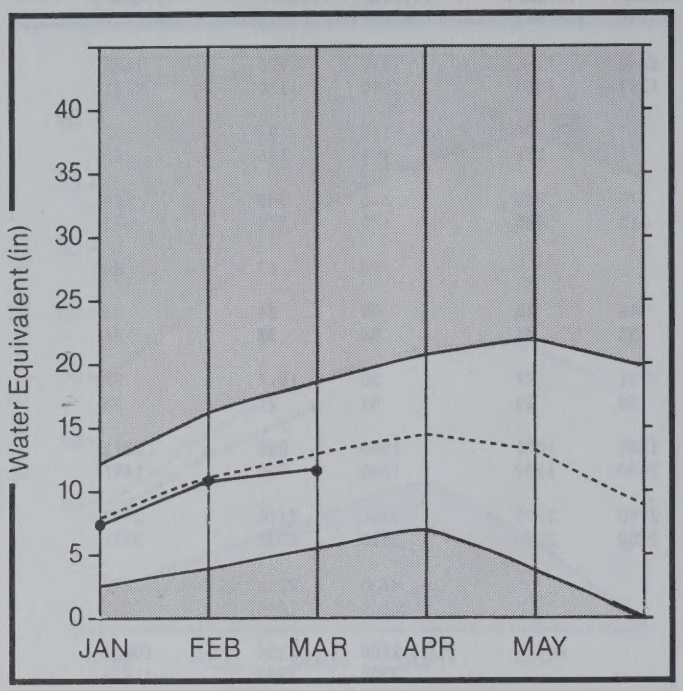
(2) - Corrected for upstream diversions or changes in reservoir storage.

Jefferson Basin

Mountain snowpack* (inches)



*Jefferson

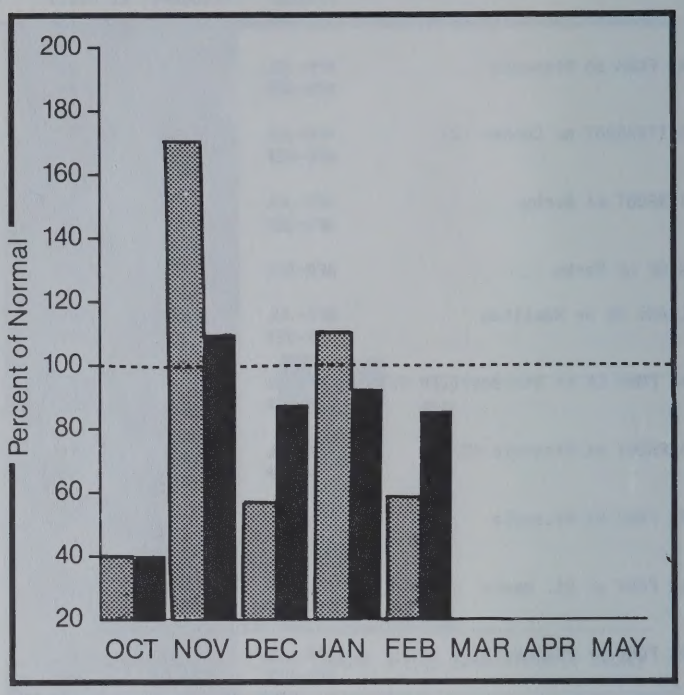
Maximum

Minimum

Average

Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation

Year to date precipitation

Water Supply Outlook

February mountain precipitation was well below average. The snowpack in the Red Rock River Drainage is average while the remainder of the basin is below average. Snowpack percentages have decreased over most of the watershed since February 1. Forecasts for April through September runoff are for below average flows throughout the basin.

For more information contact your local Soil Conservation Service Office.

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	WET SUBS. (1000AF)	DRY SUBS. (1000AF)	REAS. MAX. (1000AF)	REAS. MIN. (1000AF)	25 YR. AVG. (1000AF)
RED ROCK RIVER near Monida 2	APR-JUL	90	86	122	62	126	54	105
	APR-SEP	97	85	137	57	136	58	114
BEAVERHEAD RIVER near Grant 2	APR-JUL	120	81	220	54	171	69	149
	APR-SEP	139	79	260	67	199	80	175
BEAVERHEAD RIVER at Barratts 2	APR-JUL	154	80	260	87	220	89	192
	APR-SEP	178	79	305	104	255	102	224
RUBY RIVER near Alder	APR-JUL	68	76	95	42	96	40	89
	APR-SEP	83	78	113	53	117	49	106
BIG HOLE RIVER near Melrose	APR-JUL	515	74	780	250	725	305	696
	APR-SEP	570	75	860	275	795	345	757
WILLOW CREEK near Harrison	APR-JUL	14.6	78	28	6.9	21	7.9	18.7
	APR-SEP	16.3	78	31	7.7	24	8.7	21
BOULDER RIVER near Boulder	APR-JUL	80	88	133	28	107	53	91
	APR-SEP	86	89	139	33	115	57	97
JEFFERSON RIVER near Three Forks	APR-JUL	740	71	1300	220	1080	395	1042
	APR-SEP	830	72	1440	275	1210	450	1156

RESERVOIR STORAGE (1000AF)

RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.
LIMA	84.0	11.0	13.1	37.5
CLARK CANYON	255.6	107.0	170.7	146.1
RUBY RIVER		NO REPORT		

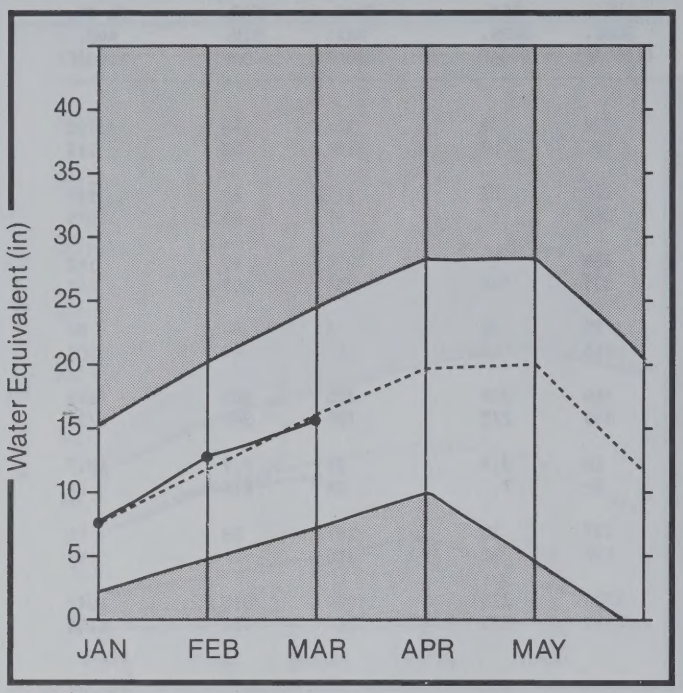
WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	THIS YEAR AS % OF AVERAGE
BEAVERHEAD	34	143	100
RUBY	13	130	90
BIGHOLE	28	121	87
BOULDER	15	123	86
JEFFERSON	72	133	94

WET SUBS. and DRY SUBS. represent 150 and 50 percent subsequent precipitation events respectively.
REAS. MAX. and REAS. MIN. forecasts are for 10% and 90% exceedance levels with the exception of (1) below.
(1) - REAS. MAX. and REAS. MIN. forecasts are for 5% and 95% exceedance levels.
(2) - Corrected for upstream diversions or changes in reservoir storage.

Madison Basin

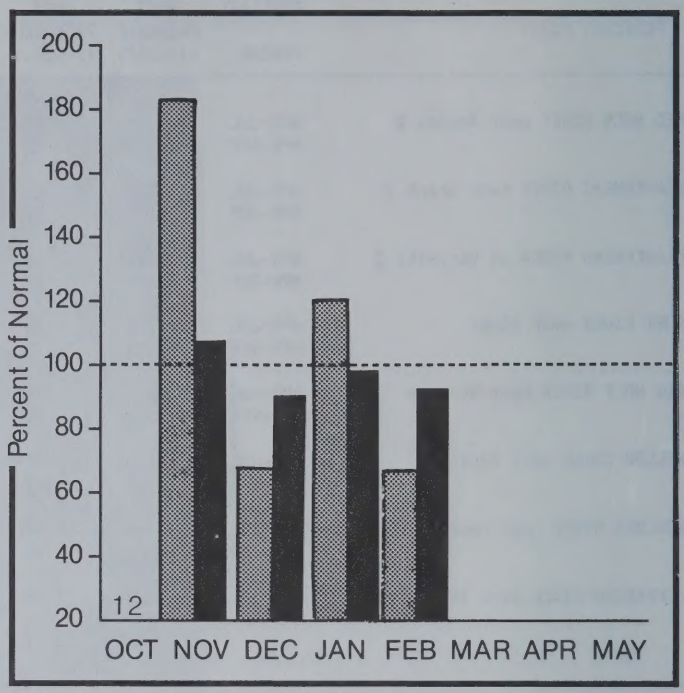
Mountain snowpack* (inches)



*Madison

Maximum
Minimum
Average
Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation
Year to date precipitation

Water Supply Outlook

Mountain precipitation for February was well below average over the basin. The snowpack in the upper basin remains above average while a little below average in the lower part. The forecasts have decreased slightly but spring and summer runoff is still expected to be near average in the upper basin and a little less downstream.

For more information contact your local Soil Conservation Service Office.

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	WET SUBS. (1000AF)	DRY SUBS. (1000AF)	REAS. MAX. (1000AF)	REAS. MIN. (1000AF)	25 YR. AVG. (1000AF)
MADISON RIVER near Grayling 2	APR-JUL	395	101	485	300	465	325	390
	APR-SEP	500	100	610	390	590	410	499
MADISON RIVER near McAllister 2	APR-JUL	655	96	860	450	775	535	680
	APR-SEP	810	95	1020	585	965	655	856

RESERVOIR STORAGE (1000AF)

RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.
ENNIS LAKE	41.0	30.8	30.7	34.8
HEBGEN LAKE	377.5	263.2	275.2	235.3

WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	THIS YEAR AS % OF AVERAGE
MADISON above HEBGEN	16	146	109
LOWER MADISON	21	124	86
MADISON	37	136	98

WET SUBS. and DRY SUBS. represent 150 and 50 percent subsequent precipitation events respectively.
REAS. MAX. and REAS. MIN. forecasts are for 10% and 90% exceedance levels with the exception of (1) below.
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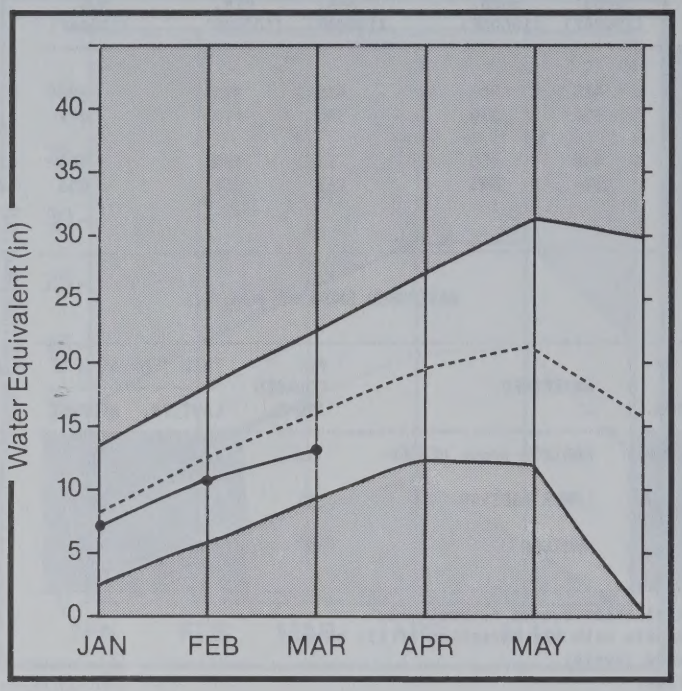
(2) - Corrected for upstream diversions or changes in reservoir storage.

Gallatin Basin

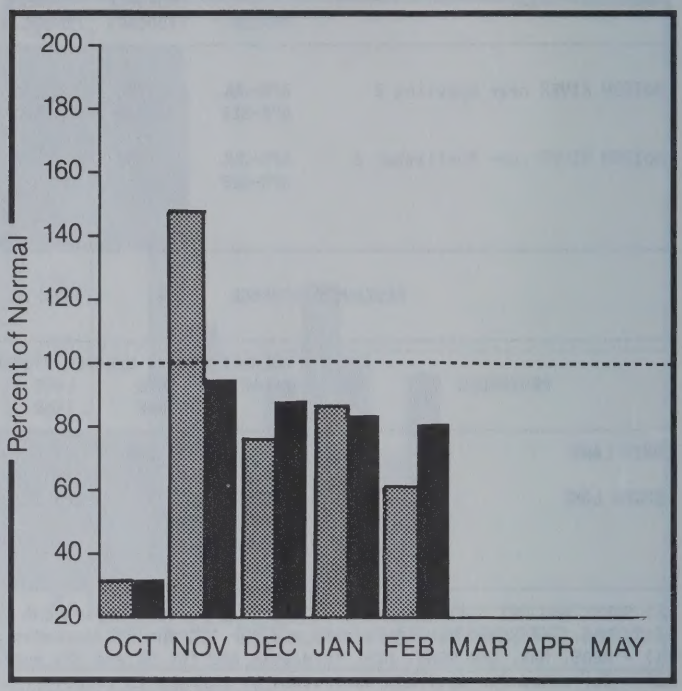
Mountain snowpack* (inches)



*Gallatin

Maximum
Minimum
Average
Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation
Year to date precipitation

Water Supply Outlook

During February, mountain precipitation was about one-half of average. The snowpack remains below average over most of the basin. Snow in the headwaters near Yellowstone National Park is a little better than other parts of the drainage. Spring and summer streamflow forecasts are 5 to 10 percent less than those issued on February 1 and continue to predict below average runoff. However, forecasted flows are still much greater than last year's runoff.

For more information contact your local Soil Conservation Service Office.

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	WET SUBS. (1000AF)	DRY SUBS. (1000AF)	REAS. MAX. (1000AF)	REAS. MIN. (1000AF)	25 YR. AVG. (1000AF)
GALLATIN RIVER near Gateway	APR-JUL	370	80	570	172	455	285	460
	APR-SEP	430	80	645	210	525	335	540
E & W FK. HYALITE CR. nr Bozeman 2	APR-JUL	19.8	83	29	11.2	25	14.8	24
	APR-SEP	23	82	34	12.6	29	17.1	28
HYALITE CREEK near Bozeman 2	APR-JUL	30	79	47	13.7	38	22	38
	APR-SEP	35	80	53	16.1	44	26	44
GALLATIN RIVER at Logan	APR-JUL	410	78	775	210	545	275	528
	APR-SEP	475	77	870	245	635	315	616

RESERVOIR STORAGE (1000AF)

RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.
MIDDLE CREEK	8.0	4.0	5.4	3.6

WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
UPPER GALLATIN	15	114	79
EAST GALLATIN	13	111	79
GALLATIN	25	114	81

WET SUBS. and DRY SUBS. represent 150 and 50 percent subsequent precipitation events respectively.
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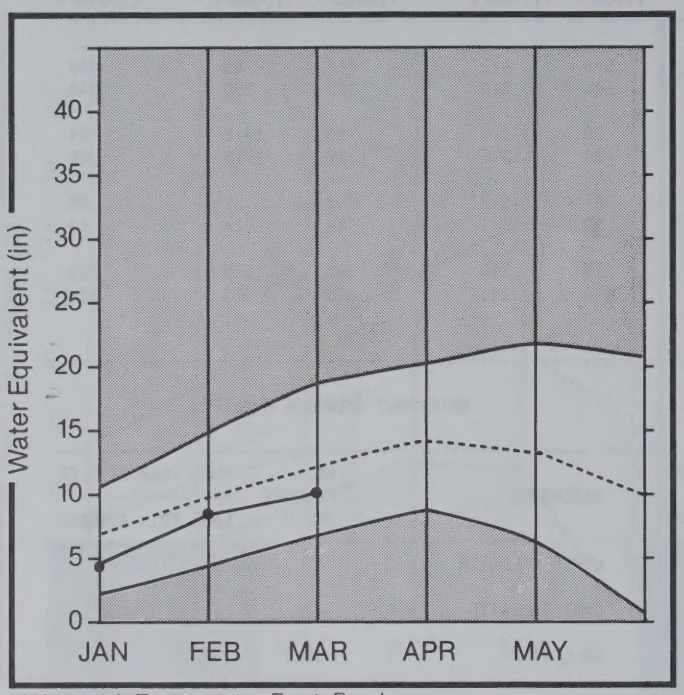
(2) - Corrected for upstream diversions or changes in reservoir storage.

Missouri Basin

Mountain snowpack* (inches)



*Missouri Toston to Fort Peck

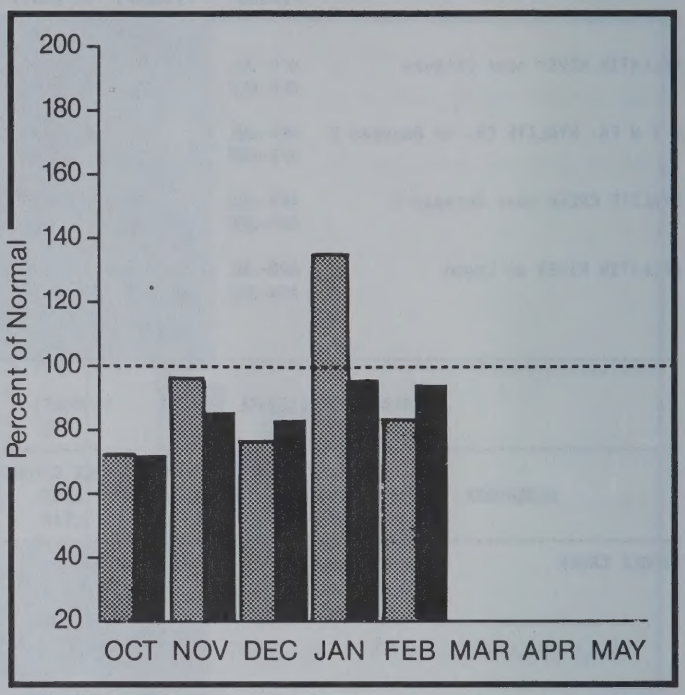
Maximum

Minimum

Average

Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation

Year to date precipitation

Water Supply Outlook

February precipitation was below average in the mountains. Snowpack levels remain below average in all drainages. Streamflow forecasts have decreased somewhat but are still in the below average range and generally indicate more water than was produced last year.

For more information contact your local Soil Conservation Service Office.

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	WET SUBS. (1000AF)	DRY SUBS. (1000AF)	REAS. MAX. (1000AF)	REAS. MIN. (1000AF)	25 YR. AVG. (1000AF)
MISSOURI RIVER at Toston 2	APR-JUL	1800	80			2410	1190	2250
	APR-SEP	2100	81			2800	1400	2590
PRICKLY PEAR CREEK nr Clancy	APR-JUL	21	81	37	5.7	31	10.9	26
	APR-SEP	25	81	43	7.6	37	12.9	31
SMITH RIVER nr Ft. Logan	APR-JUL	50	74	91	21	75	25	68
	APR-SEP	60	75	102	24	90	30	80
SHEEP CREEK nr White Sulphur Spgs.	APR-JUL	14.2	76	19.7	8.7	22	6.7	18.8
	APR-SEP	16.5	75	22	10.6	25	7.7	22
BELT CREEK near Monarch	APR-JUL	92	75	141	42	136	48	123
	APR-SEP	100	75	151	48	148	52	134
MISSOURI RIVER at Fort Benton 2	APR-JUL	2570	74			4100	1390	3470
	APR-SEP	3130	78			4890	1770	3990
MISSOURI RIVER at Virgelle 2	APR-JUL	3050	77			4550	1740	3960
	APR-SEP	3580	80			5290	2100	4500
MISSOURI RIVER near Landusky 2	APR-JUL	3360	78			5080	1940	4310
	APR-SEP	3960	81			5920	2340	4900
N.F. MUSSELSHELL near Delpine	APR-JUL	4.4	80	6.9	1.9	6.6	2.2	5.6
	APR-SEP	5.2	82	7.9	2.5	7.8	2.6	6.4
S.F. MUSSELSHELL above Martinsdale	APR-JUL	45	79	76	13.6	68	22	57
	APR-SEP	47	77	79	14.7	71	23	61
MISSOURI RIVER below Fort Peck 2	APR-JUL	3340	79			5130	1810	4260
	APR-SEP	3850	80			5870	2120	4800
LAKE SAKAKAWEA Inflow 2	APR-JUL	9240	84			12900	5830	11000
	APR-SEP	10400	85			14400	6620	12200

RESERVOIR STORAGE (1000AF)

RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.
CANYON FERRY LAKE	2043.0	1267.0	1441.0	1563.0
HELENA VALLEY	9.2	4.6	4.9	4.7
LAKE HELENA	10.4	10.7	10.9	10.1
HAUSER & HELENA	61.9	62.5	63.1	60.7
HOLTER LAKE	81.9	78.3	76.7	66.6
SMITH RIVER	10.6	1.5	3.3	7.2
NEWLAN CREEK		NO REPORT		
BAIR	7.0	0.6	2.0	4.5
MARTINSDALE	23.1	0.2	4.3	10.0
DEADMAN'S BASIN	72.2	15.6	40.3	48.3
FORT PECK LAKE*	18.9	12.1	14.7	14.9

* Millon Acre Feet

WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
MISSOURI HEADWATERS	117	131	94
WEST SIDE MISSOURI	11	115	88
SMITH-BELT	11	123	84
MISSOURI MAINSTEM	22	119	86
SUN-TETON-MARIAS	18	135	89
JUDITH-MUSSELSHELL	17	115	82
MISSOURI above FORT PECK	159	130	92
MILK HEADWATERS	4	160	86
BEAR PAW	7	102	78
MILK RIVER	11	139	84
MISSOURI in MONTANA	168	130	92
MISSOURI blw YELLOWSTONE	267	122	88

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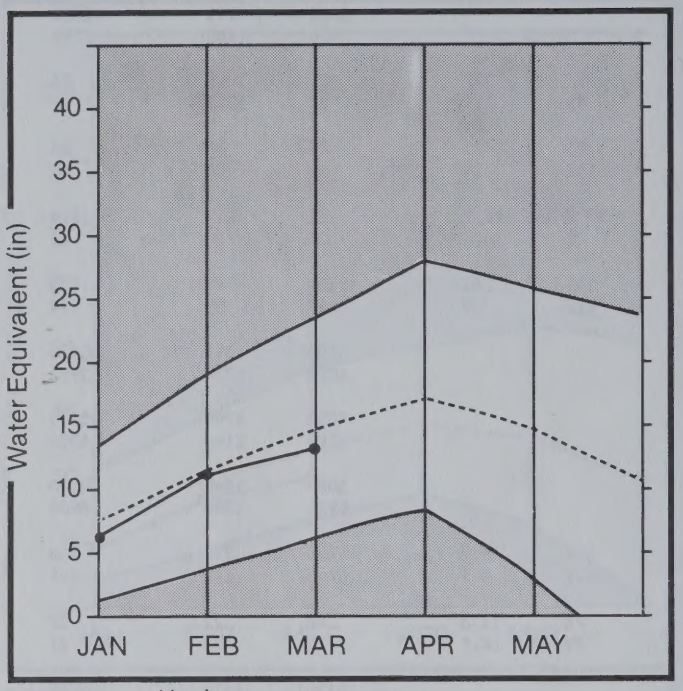
Sun, Teton and Marias Basins

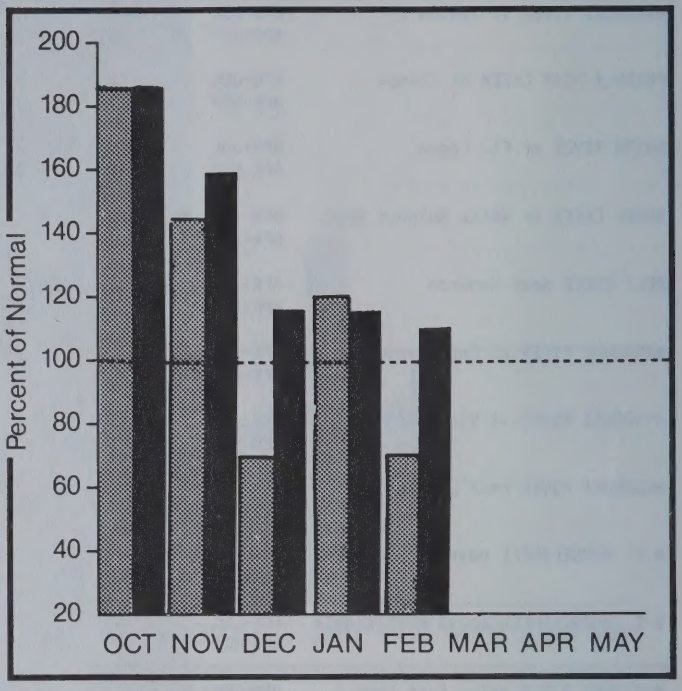
Mountain snowpack* (inches)



*Sun-Teton-Marias

Maximum
Minimum
Average
Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation
Year to date precipitation

Water Supply Outlook

Mountain precipitation was below average for February. Snowpack percentages decreased about 10 percent and are now below average except for near average snow near the Continental Divide. Spring and summer runoff forecasts decreased accordingly but still project runoff within 10 to 15 percent of average.

For more information contact your local Soil Conservation Service Office.

SUN-TETON-MARIAS RIVER BASINS

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	WET SUBS. (1000AF)	DRY SUBS. (1000AF)	REAS. MAX. (1000AF)	REAS. MIN. (1000AF)	25 YR. AVG. (1000AF)
SUN RIVER at Gibson Dam 2	APR-JUL	405	82	545	270	525	285	494
	APR-SEP	445	82	585	310	575	315	542
TWO MEDICINE CREEK near Browning 2	APR-JUL	196	88	270	127	275	116	222
	APR-SEP	205	87	280	137	285	125	235
BADGER CREEK near Browning	APR-JUL	98	92	128	68	137	59	107
	APR-SEP	114	93	146	82	156	72	123
SWIFT RESERVOIR Inflow nr Dupuyer	APR-JUL	66	94	86	46	91	41	70
	APR-SEP	77	94	98	57	105	49	82
CUT BANK CREEK at Cut Bank	APR-JUL	81	88	110	52	114	48	92
	APR-SEP	89	89	122	56	123	55	100
MARIAS RIVER near Shelby	APR-JUL	400	84			695	250	478
	APR-SEP	420	84			725	275	501

RESERVOIR STORAGE (1000AF)

RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.
GIBSON	99.1	30.2	53.9	46.4
PISHKUN	32.0	19.4	18.1	18.1
WILLOW CREEK	32.2	23.1	24.3	20.3
LOWER TWO MEDICINE LAKE	11.9	11.9	10.3	8.0
FOUR HORNS LAKE	19.2	14.0	13.7	12.3
SWIFT	30.0	13.0	23.8	14.9
LAKE FRANCES	112.0	41.8	93.5	68.5
LAKE ELWELL (TIBER)	1347.0	641.7	675.0	555.2

WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
SUN-TETON	13	134	92
MARIAS	6	137	87
SUN-TETON-MARIAS	18	135	89

WET SUBS. and DRY SUBS. represent 150 and 50 percent subsequent precipitation events respectively.
REAS. MAX. and REAS. MIN. forecasts are for 10% and 90% exceedance levels with the exception of (1) below.
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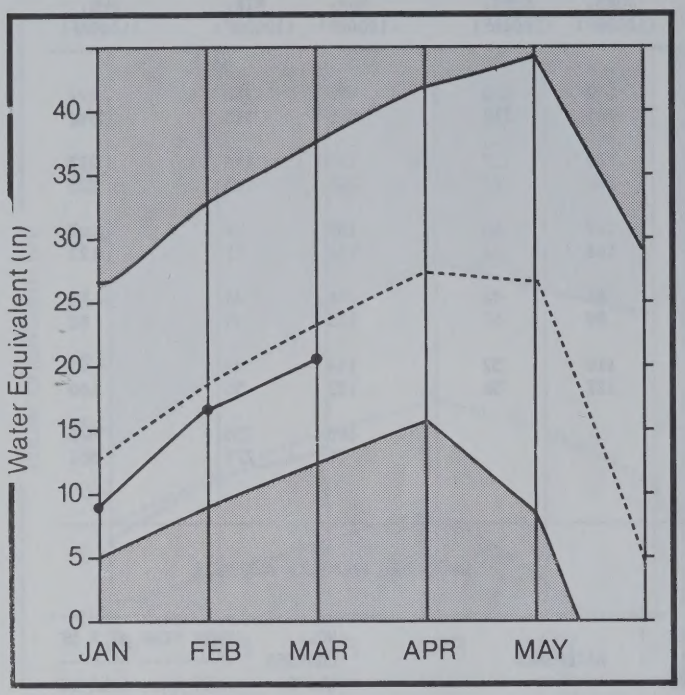
(2) - Corrected for upstream diversions or changes in reservoir storage.

St. Mary and Milk Basins

Mountain snowpack* (inches)



St. Mary

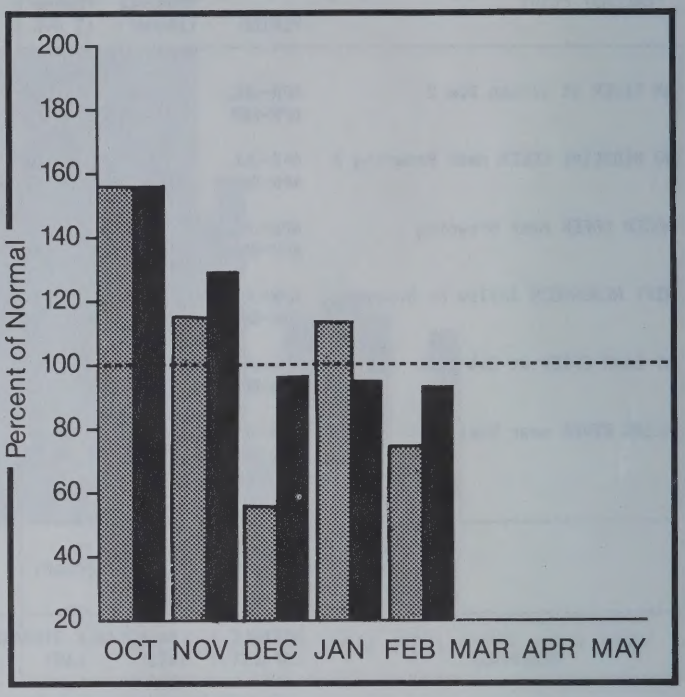
Maximum

Minimum

Average

Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation

Year to date precipitation

Water Supply Outlook

February mountain precipitation was well below average. Snowpack in the Bow and Oldman River Drainages in Alberta remain average but is below average in Montana. Runoff forecasts have decreased and indicate below average runoff for the entire watershed. The natural flow of the Milk River, without the St. Mary Canal, is expected to produce only 65 percent of average runoff.

For more information contact your local Soil Conservation Service Office.

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	WET SUBS. (1000AF)	DRY SUBS. (1000AF)	REAS. MAX. (1000AF)	REAS. MIN. (1000AF)	25 YR. AVG. (1000AF)
SWIFTCURRENT CREEK at Sherburne 2	APR-JUL	96	87	113	82	120	72	110
	APR-SEP	114	89	131	100	142	86	128
ST. MARY RIVER near Babb 2	APR-JUL	345	85	415	275	410	280	404
	APR-SEP	405	85	475	340	480	330	474
MILK RIVER at Eastern Crossing	MAR-SEP	63	65			111	50	97
MILK RIVER at Eastern Crossing 2	MAR-SEP	250	93			295	220	270

RESERVOIR STORAGE (1000AF)

RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.
LAKE SHERBURNE	64.3	30.0	38.9	24.1
FRESNO	127.0	4.6	58.8	51.5
BEAVER CREEK	3.5	0.6	2.8	2.0
NELSON	66.8	3.0	42.5	36.0

WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
MILK HEADWATERS	4	160	86
BEAR PAW	7	102	78
MILK RIVER	11	139	84
ST. MARY	6	147	85
ST. MARY and MILK	13	137	83
BOW RIVER in ALBERTA	21	138	107
OLDMAN RIVER in ALBERTA	8	163	111

WET SUBS. and DRY SUBS. represent 150 and 50 percent subsequent precipitation events respectively.
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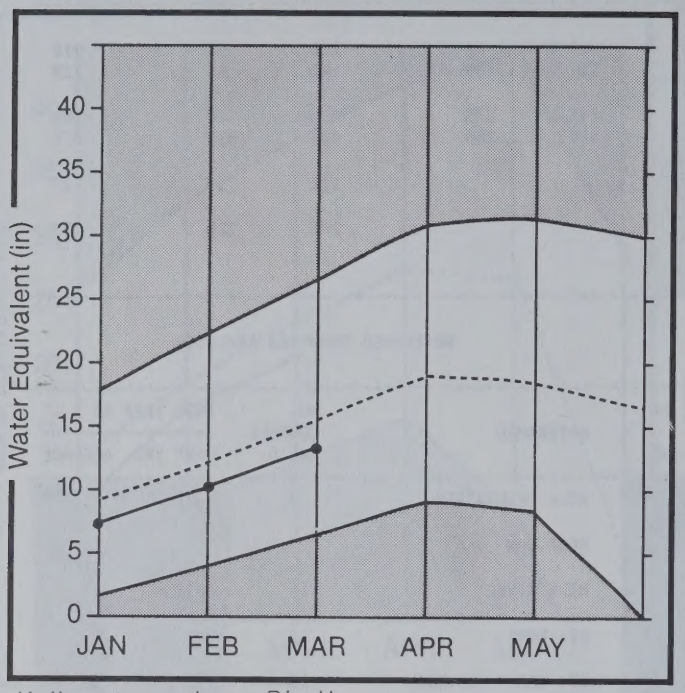
(2) - Corrected for upstream diversions or changes in reservoir storage.

Yellowstone Basin

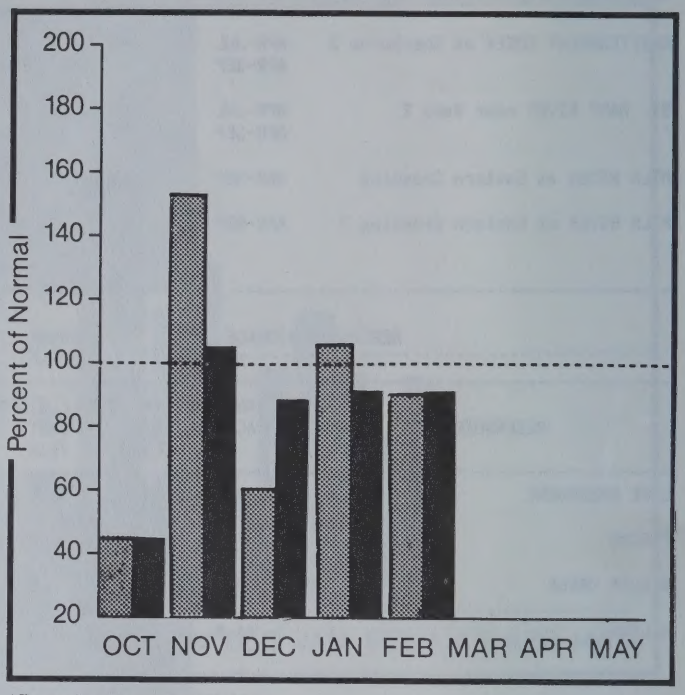
Mountain snowpack* (inches)



*Yellowstone above Big Horn

Maximum
Minimum
Average
Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation
Year to date precipitation

Water Supply Outlook

Mountain precipitation during February was about 90 percent of average. The snowpack remains a little below average throughout the basin with the best snowpacks found in the headwaters and Yellowstone National Park areas. The Tongue and Powder River watersheds have much below average snowpack. Spring and summer runoff forecasts remain unchanged from last month at a little below average. Below average flow is forecast from most tributaries downstream from Yellowstone National Park.

For more information contact your local Soil Conservation Service Office.

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	WET SUBS. (1000AF)	DRY SUBS. (1000AF)	REAS. MAX. (1000AF)	REAS. MIN. (1000AF)	25 YR. AVG. (1000AF)
YELLOWSTONE at Lake Outlet	APR-JUL	585	99	705	460	680	490	590
	APR-SEP	835	102	1000	670	965	705	818
YELLOWSTONE at Corwin Springs	APR-JUL	1600	97	1980	1220	1860	1340	1650
	APR-SEP	1960	98	2400	1520	2280	1640	2000
YELLOWSTONE near Livingston	APR-JUL	1820	95	2260	1400	2130	1510	1920
	APR-SEP	2190	94	2700	1700	2560	1820	2330
SHIELDS RIVER near Livingston	APR-JUL	120	80	210	30	165	75	150
	APR-SEP	134	80	230	40	184	84	167
BOULDER RIVER at Big Timber	APR-JUL	295	84	360	230	380	210	353
	APR-SEP	320	83	390	245	410	230	384
WEST ROSEBUD CREEK near Roscoe	APR-JUL	57	89	73	42	74	40	64
	APR-SEP	72	87	88	57	94	50	83
STILLWATER RIVER nr Absarokee 2	APR-JUL	485	93	620	350	655	315	524
	APR-SEP	580	93	730	430	780	380	625
CLARKS FORK RIVER near Belfry	APR-JUL	480	89	615	345	640	320	540
	APR-SEP	535	89	700	380	715	355	603
COONEY RESERVOIR Inflow	APR-JUL	40	82	65	15.0	56	24	49
	APR-SEP	49	82	78	20	68	30	60
YELLOWSTONE RIVER at Billings 2	APR-JUL	3330	89			4080	2540	3740
	APR-SEP	3920	89			4850	3040	4410
YELLOWSTONE RIVER at Miles City 2	APR-JUL	5000	89			6470	3650	5640
	APR-SEP	5820	89			7450	4190	6510
YELLOWSTONE RIVER near Sidney 2	APR-JUL	5460	87			7150	3770	6260
	APR-SEP	6280	87			8220	4340	7200

RESERVOIR STORAGE (1000AF)

RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.
MYSTIC LAKE	21.0	2.2	1.7	6.5
COONEY	27.4	19.9	21.5	14.5
BIGHORN LAKE	1356.0	660.9	835.4	660.0
TONGUE RIVER	68.0	36.9	23.2	30.7

WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
YELLOWSTONE ab LIVINGSTON	25	130	87
SHIELDS	10	129	87
BOULDER-STILLWATER	6	110	83
CLARK'S FORK-ROCK CREEK	20	128	87
YELLOWSTONE above BIGHORN	48	125	85
LITTLE BIGHORN	5	86	72
WIND RIVER (Wyoming)	29	101	85
BIGHORN RIVER (Wyoming)	33	101	74
BIGHORN BASIN (Total)	57	102	79
TONGUE RIVER (Wyoming)	15	78	64
POWDER RIVER (Wyoming)	15	80	61
YELLOWSTONE RIVER	114	108	80

WET SUBS. and DRY SUBS. represent 150 and 50 percent subsequent precipitation events respectively.
REAS. MAX. and REAS. MIN. forecasts are for 10% and 90% exceedance levels with the exception of (1) below.
(1) - REAS. MAX. and REAS. MIN. forecasts are for 5% and 95% exceedance levels.
(2) - Corrected for upstream diversions or changes in reservoir storage.

Snow Data Measurements

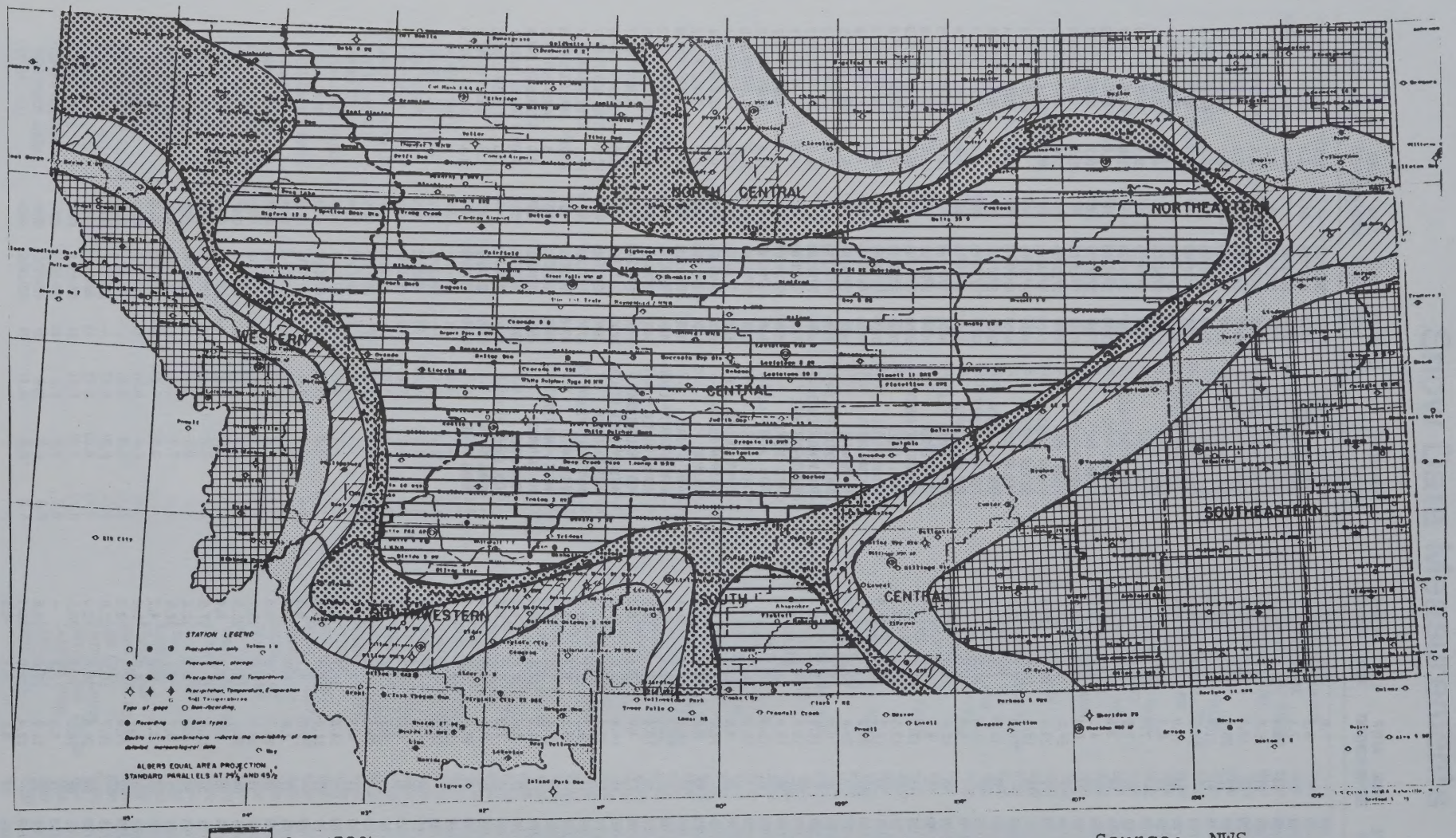
SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-85
MONTANA						
ABUNDANCE LAKE	8800	2/25/89	50	13.8	12.6	17.6
AMBROSE	6480	2/28/89	42	10.2	9.8	11.3
ARCH FALLS	7350	2/27/89	33	7.6	7.9	10.1
ASHLEY DIVIDE	4820	2/26/89	26	5.6	5.0	6.2
BADGER PASS PILLOW	6900	3/01/89	---	26.9	20.2	29.5
BADGER PASS	6900	2/25/89	77	28.8	22.2	33.7
BALD EAGLE PEAK	5700	2/23/89	120	42.9E	34.8	53.5
BALD RIDGE	7500	3/03/89	51	11.2	7.6	10.9
BANFIELD MTN PILLOW	5600	3/01/89	---	14.3	10.8	18.1
BANFIELD MOUNTAIN	5600	2/24/89	47	14.4	10.8	20.8
BAREE CREEK	5500	2/24/89	85	30.1	24.2	41.0
BAREE MIDWAY	4600	2/24/89	75	25.6	21.3	31.9
BAREE TRAIL	3800	2/24/89	28	7.2	5.6	8.8
BARKER LAKES PILLOW	8250	3/01/89	---	10.1	8.0	12.7
BASIN CREEK	7180	2/23/89	28	5.8	4.1	7.0
BASIN CREEK PILLOW	7180	3/01/89	---	4.9	3.6	6.9
BASSOO PEAK	5150	2/24/89	35	8.6	6.1	10.5
BEAGLE SPRINGS	8850	3/01/89	29	6.9	6.9	7.5
BEAGLE SPGS PILLOW	8850	3/01/89	---	5.7	4.8	6.9
BEAR BASIN	8150	2/23/89	48	13.0	14.1	18.2
BEAR PAW SKI AREA	5200	2/25/89	22	4.9	5.5	6.6
BEAVER CREEK PILLOW	7850	3/01/89	---	13.3	10.7	15.8
BERRY MEADOW	7000	2/27/89	28	6.5	5.4	6.8
BIG CREEK	6750	3/04/89	102	37.2	24.0	38.2
BIG SKY	7700	3/01/89	47	7.9	11.0	13.2
BIG SKY MEADOW	6350	2/23/89	32	7.8	5.6	8.5
BIG SNOWY	7150	2/23/89	42	11.4	11.8	18.2
BLACK BEAR	7950	2/23/89	102	38.6	29.7	35.0
BLACK BEAR PILLOW	7950	3/01/89	---	35.8	25.4	31.8
BLACK PINE PILLOW	7100	3/01/89	---	9.6	9.3	12.1
BLACK PINE	7100	2/24/89	34	9.6	8.6	11.8
BLACKTAIL	5650	2/25/89	46	13.9	7.8	--
BLOODY DICK PILLOW	7550	3/01/89	---	9.0	8.1	10.9
BLOODY DICK	7600	2/25/89	35	9.4	9.0	11.8
BLUE LAKE	5900	2/25/89	57	20.1	14.7	22.6
BOTS SOTS	7750	3/01/89	28	5.5	5.6	6.3
BOULDER MOUNTAIN	7950	2/23/89	44	12.8	11.2	16.5
BOULDER MTN PILLOW	7950	3/01/89	---	15.2	11.8	17.9
BOX CANYON	6670	2/25/89	32	8.4	10.0	10.5
BOX CANYON PILLOW	6700	3/01/89	---	7.2	6.7	8.4
BOXELDER CREEK	5100	2/25/89	28	5.5	5.6	7.5
BRANHAM LAKES	8850	2/23/89	69	22.0	17.7	25.0
BRIDGER BOWL PILLOW	7250	2/28/89	---	16.4	13.6	21.7
BRIDGER BOWL	7250	2/28/89	78	20.8	14.6	22.6
BRISTOW CREEK	3900	2/24/89	28	7.2	5.4	10.5
BRUSH CREEK TIMBER	5000	2/27/89	31	6.3	4.4	9.0
BULL MOUNTAIN	6600	2/23/89	25	6.0	3.6	5.1
CABIN CREEK	5200	2/26/89	25	6.6	5.0	6.0
CALL ROAD	8050	2/26/89	38	9.7	6.4	9.8
CALVERT CREEK	6430	3/01/89	39	9.4	7.2	10.2
CALVERT CR PILLOW	6430	3/01/89	---	7.2	6.0	8.4
CAMP MISERY	6400	2/23/89	109	40.2	28.1	42.2
CAMP SENIA	7890	3/01/89	21	3.7	3.1	4.8
CARROT BASIN PILLOW	9000	3/01/89	---	20.2	14.4	23.3
CARROT BASIN	9000	2/27/89	76	25.8	18.8	30.6
CARTER CREEK	7400	3/02/89	22	4.5	--	3.9
CASHE CREEK PILLOW	7800	3/01/89	---	9.0	7.4	7.9
CEDAR GROVE	3760	2/23/89	45	11.2	8.6	11.1
CHESSMAN RESERVOIR	6200	2/27/89	19	4.4	3.0	3.4
CHICKEN CREEK	4060	2/23/89	47	15.3	11.9	14.5
CLOVER MDW PILLOW	8800	3/01/89	---	11.2	9.5	14.7
CLOVER MEADOW	8600	2/26/89	41	11.0	9.0	14.4
COLE CREEK	7850	2/28/89	50	10.5	6.0	13.7
COLE CREEK PILLOW	7850	3/01/89	---	9.4	7.0	14.2
COLLEY CREEK	6300	2/27/89	26	5.6	5.2	7.3
COMBINATION	5600	2/24/89	20	4.2	3.6	5.0
COMBINATION PILLOW	5600	3/01/89	---	5.3	4.7	5.2
COOKE STATION	8150	2/27/89	58	18.0	12.0	17.1
COPPER BOTTOM	5200	2/25/89	39	10.8	9.5	10.6
COPPER BOTTOM PILLOW	5200	3/01/89	---	10.9	8.7	11.9
COPPER CAMP PILLOW	6950	3/01/89	---	23.8	19.6	30.6
COPPER CAMP	6950	2/25/89	66	22.8	20.6	27.1
COPPER CREEK	5700	2/25/89	42	12.3	10.6	13.8
COPPER MOUNTAIN	7700	2/22/89	34	8.5	6.0	9.6
COTTONWOOD CREEK	6400	3/03/89	32	6.2	5.0	6.9
COYOTE HILL	4200	3/01/89	45	11.0	8.0	9.7
CREVICE MOUNTAIN	8400	2/28/89	38	8.6	5.8	9.3
CRYSTAL LAKE	6050	2/23/89	34	8.6	8.6	11.8
CRYSTAL LAKE PILLOW	6050	3/01/89	---	8.7	9.7	11.7
DAD CREEK LAKE	8400	3/01/89	38	10.4	8.0	11.2
DAISY PEAK	7600	2/24/89	31	7.5	5.6	9.6
DALY CREEK	5780	2/27/89	37	8.0	8.7	10.0
DALY CREEK PILLOW	5780	3/01/89	---	8.1	7.8	9.5
DARKHORSE LK. PILLOW	8700	3/01/89	---	16.2	14.7	20.7
DARKHORSE LAKE	8600	2/25/89	56	18.4	16.6	23.5
DAVIS CREEK	5400	2/23/89	58	18.4	14.0	20.9
DEADMAN CR PILLOW	6450	3/01/89	---	7.8	7.3	9.2
DEADMAN CREEK	6450	2/24/89	33	9.0	7.6	10.1
DESERT MOUNTAIN	5600	2/23/89	38	10.5	7.9	13.8
DEVILS SLIDE	8100	2/27/89	49	12.9	11.8	18.5
DISCOVERY BASIN	7050	2/24/89	33	8.2	6.4	9.1
DIVIDE	7800	2/26/89	39	10.6	7.2	9.5
DIVIDE PILLOW	7800	3/01/89	---	9.0	6.1	10.0
DIX HILL	6400	2/26/89	35	9.9	9.5	11.1
DUPUYER CREEK PILLOW	5750	3/01/89	---	11.8	7.4	11.2
EAST FORK R.S.	5400	2/26/89	22	2.8	6.9	6.2
EL DORADO MINE	7800	2/27/89	57	13.6	12.3	17.4
ELK HORN SPRINGS	7800	2/25/89	34	8.2	6.6	8.1
ELK PEAK	8000	2/28/89	47	11.0	8.2	14.0
EMERY CREEK	4350	2/23/89	41	12.0	9.6	14.9
EMERY CREEK PILLOW	4350	3/01/89	---	10.9	9.3	14.4
FATTY CREEK	5500	3/04/89	75	20.0	13.5	20.6
FISH CREEK	8000	2/23/89	29	6.4	4.2	8.1
FISHER CREEK PILLOW	9100	3/01/89	---	26.4	21.6	30.9
FISHER CREEK	9100	2/27/89	82	28.8	22.8	32.7
FIVE-BULL	5700	2/25/89	22	5.6	3.1	6.0
FLATTOP MTN PILLOW	6300	3/01/89	---	33.5	25.2	40.7
FLEECER RIDGE	7500	2/23/89	38	9.3	6.8	9.3
FOOLHEN	8280	2/25/89	44	11.3	9.8	14.4
FOUR MILE	6900	2/27/89	30	7.6	5.2	7.3
FOURTH OF JULY	3450	2/27/89	30	6.9	7.2	8.5
FRED BURR PASS	8000	3/01/89	66	16.4	15.3	21.3
FREIGHT CREEK	6000	2/25/89	42	12.2	9.2	13.2
FRIDAY HILL	4620	2/27/89	52	14.6	10.7	18.7
FROHNER MEADOWS	6480	2/27/89	28	6.4	5.2	7.2
FROHNER MDWS PILLOW	6480	3/01/89	---	6.1	4.4	7.9
GARVER CREEK PILLOW	4250	2/23/89	---	8.0	5.8	9.3
GARVER CREEK	4250	2/23/89	35	9.8	6.1	10.1
GIBBONS PASS	7100	2/27/89	59	18.8	15.6	20.5
GOAT MOUNTAIN	7000	2/27/89	33	8.6	6.5	9.4
GOLD CREEK LAKE	7200	2/27/89	43	10.6	10.2	12.9
GOLD STONE	8100	2/25/89	41	11.7	10.3	14.9
GRASSHOPPER	7000	2/28/89	26	5.2	2.8	5.0
GRAVE CRK PILLOW	4300	3/01/89	---	14.0	9.0	16.0
GRAVE CREEK	4300	2/23/89	44	14.2	9.1	16.2
GRIFFIN CR DIVIDE	5150	2/23/89	35	8.7	6.4	10.5
GUNSIGHT LAKE	6300	2/24/89	83	30.6	28.1	35.7
HAND CREEK	5030	2/27/89	40	9.0	6.8	12.1
HAND CREEK PILLOW	5030	3/01/89	---	9.7	6.2	11.8
HAWKINS LAKE PILLOW	6450	3/01/89	---	19.8	14.9	24.3
HAWKINS LAKE	6450	2/23/89	63	21.9	17.9	26.3
HEART LAKE TRAIL	4800	2/25/89	56	18.0	15.2	19.5
HEBGEN DAM	6550	2/22/89	44	11.6	7.4	11.1
HELL ROARING DIVIDE	5770	2/28/89	74	24.9	16.4	27.4
HERRIG JUNCTION	4850	2/23/89	64	21.5	15.6	24.3
HOLBROOK	4530	3/01/89	31	8.1	6.6	9.1
HOOD MEADOW	6600	2/27/89	32	6.9	7.0	9.0
HOODOO BASIN PILLOW	6050	3/01/89	---	32.2	27.6	41.4
HOODOO BASIN	6050	2/25/89	95	35.4	33.0	43.9
HOODOO CREEK	5900	2/25/89	88	31.6	28.9	40.7
INDEPENDENCE	7850	2/25/89	45	12.4	12.0	16.0
INTERGAARD	6450	2/23/89	26	6.0	5.8	7.1
JAHNKE LAKE TRAIL	7200	2/25/89	31	8.1	6.6	8.8
JOHNSON PARK	6450	2/24/89	25	6.4	5.6	6.6
KEELER CREEK	3300	2/24/89	44	13.6	9.4	13.6
KINGS HILL	7500	2/24/89	35	9.6	9.4	11.9
KISHENEHN	3890	2/25/89	27	6.0	4.2	7.9
KIWANIS CAMP	3720	2/25/89	8	1.2	1.2	2.0
KRAFT CREEK PILLOW	4750	3/01/89	---	16.3	9.6	11.1
LAKE CREEK	6100	2/26/89	32	7.8	4.0	7.7
LAKEVIEW CANYON	6930	2/23/89	39	9.8	4.1	10.0
LAKEVIEW RDG. PILLOW	7400	3/01/89	---	11.1	5.8	11.2
LAKEVIEW RIDGE	7400	2/23/89	37	9.4	4.2	9.1
LEMHI PASS	7480	2/25/89	30	7.1	6.3	7.7
LEMHI RIDGE	8100	2/25/89	33	8.4	7.0	8.7

MOUNTAIN SNOWWATER EQUIVALENT FOR MONTANA

SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-85
LEMHI RIDGE PILLOW	8100	3/01/89	---	7.6	6.6	9.2
LICK CREEK PILLOW	6860	3/01/89	---	8.2	6.6	8.4
LICK CREEK	6860	2/27/89	33	7.1	7.6	8.5
LITTLE PARK	7400	2/23/89	43	10.7	10.4	14.0
LOGAN CREEK	4300	2/27/89	31	5.8	4.0	7.0
LONE MOUNTAIN	8880	3/01/89	58	13.8	13.2	19.6
LOST HORSE	5940	2/26/89	72	23.9	23.7	28.7
LOST SOUL	4800	2/24/89	41	11.9	9.1	14.6
LOWER TWIN PILLOW	7900	3/01/89	---	14.3	9.9	16.8
LOWER TWIN	7900	2/27/89	53	17.0	14.8	18.3
LUBRECHT FLUME	4680	3/02/89	29	6.3	4.6	5.5
LUBRECHT PILLOW	4680	3/01/89	---	7.3	5.1	5.5
LUBRECHT FOREST NO 3	5450	3/02/89	34	7.5	5.0	6.5
LUBRECHT FOREST NO 4	4650	3/02/89	18	3.6	2.7	3.3
LUBRECHT FOREST NO 6	4040	3/01/89	20	4.1	3.6	3.9
LUBRECHT HYDROPLOT	4200	3/02/89	27	6.4	5.0	6.8
MADISON PLT PILLOW	7750	3/01/89	---	24.2	15.3	20.6
MADISON PLATEAU	7750	2/23/89	72	25.7	16.7	19.3
MANY GLACIER	4900	2/23/89	49	16.0	10.4	18.5
MANY GLACIER PILLOW	4900	3/01/89	---	16.3	8.3	16.7
MARIAS PASS	5250	2/26/89	39	12.3	7.4	15.5
MAYNARD CREEK	6210	2/28/89	51	11.3	10.5	13.2
MAYNARD CR PILLOW	6210	2/28/89	---	9.4	6.9	9.6
MIDDLE MILL CREEK	7850	2/23/89	45	12.6	11.7	14.2
MILL CREEK	7500	2/27/89	35	8.1	7.8	11.0
MINERAL CREEK	4000	2/24/89	45	13.8	10.4	16.3
MONUMENT PK PILLOW	8850	3/01/89	---	13.6	11.7	17.8
MONUMENT PEAK	8850	2/25/89	56	17.5	14.8	22.9
MOSS PEAK	6780	3/04/89	100	35.8	23.5	--
MOSS PEAK PILLOW	6780	3/01/89	---	29.0	20.2	34.4
MOULTON RESERVOIR	6850	2/28/89	32	6.0	4.7	5.7
MT LOCKHART PILLOW	6400	3/01/89	---	15.9	13.3	18.1
MOUNT LOCKHART	6400	3/01/89	62	19.6	14.0	20.0
MUDD LAKE	7650	3/01/89	56	15.0	13.2	17.6
MULE CREEK	8300	2/28/89	42	11.3	10.2	12.7
MULE CREEK PILLOW	8300	3/01/89	---	11.3	10.1	11.4
NEVADA CREEK	6480	2/25/89	35	9.8	10.5	11.6
NEVADA CREEK PILLOW	6480	3/01/89	---	12.0	9.3	11.4
NEW WORLD	6900	2/24/89	33	9.0	10.4	12.5
NEWTON MOUNTAIN	5600	2/27/89	74	24.1	17.0	31.4
NEZ PERCE CMP PILLOW	5650	3/01/89	---	12.7	11.9	13.2
NEZ PERCE CAMP	5650	2/26/89	45	12.4	13.4	13.5
NEZ PERCE CREEK	6600	2/22/89	23	4.8	3.4	6.2
NEZ PERCE PASS	6570	2/26/89	48	14.4	13.6	15.0
NOISY BASIN	6040	2/23/89	103	37.2	26.4	37.8
NOISY BASIN PILLOW	6040	3/01/89	---	33.2	22.7	33.4
N.F. ELK CR PILLOW	6250	3/01/89	---	10.1	8.2	11.2
N.F. ELK CREEK	6250	3/05/89	42	11.4	7.9	10.5
NORTH FORK JOCKO	6330	3/04/89	113	41.3	24.6	39.4
NORTH MEADOW	7500	2/27/89	27	6.6	4.4	7.0
N.E. ENTRANCE PILLOW	7350	3/01/89	---	7.3	5.7	8.2
NORTHEAST ENTRANCE	7350	3/01/89	35	8.1	4.6	8.4
NOTCH	8500	2/26/89	39	10.5	7.0	13.2
OPHIR PARK	7150	2/26/89	46	13.8	12.2	15.0
PETERSON MDW PILLOW	7200	3/01/89	---	6.9	6.0	9.0
PETERSON MEADOWS	7200	2/28/89	35	7.8	6.5	8.5
PICKFOOT CREEK	6650	2/23/89	31	8.3	5.7	9.9
PICKFOOT CRK PILLOW	6650	3/01/89	---	8.7	6.0	9.4
PIKE CREEK PILLOW	5930	3/01/89	---	19.3	13.8	23.6
PIPESTONE PASS	7200	2/22/89	21	4.6	2.5	4.2
PLACER BASIN PILLOW	8830	3/01/89	---	14.6	11.7	13.6
POORMAN CREEK	5100	2/23/89	72	24.4	18.8	30.8
PORCUPINE PILLOW	6500	3/01/89	---	5.1	4.1	6.5
PORCUPINE	6500	3/03/89	37	7.4	4.0	6.5
POTOMAGETON PARK	7150	2/28/89	46	11.7	10.6	13.0
RED MOUNTAIN	6000	2/24/89	49	13.2	8.5	16.7
RED TOP	5260	2/27/89	64	19.1	13.6	25.5
ROCK CREEK	5600	2/23/89	33	9.3	9.0	8.6
ROCK CREEK MEADOW	8160	2/29/89	57	14.0	12.2	17.9
ROCKER PEAK	8000	2/27/89	40	9.9	9.8	12.6
ROCKER PEAK PILLOW	8000	3/01/89	---	8.7	8.1	12.5
ROCKY BOY	4700	2/25/89	16	2.8	3.2	4.2
ROCKY BOY PILLOW	4700	2/25/89	---	4.2	4.0	5.2
SACAJAWEA	6550	2/28/89	52	11.4	8.3	12.5
SADDLE MTN PILLOW	7900	3/01/89	---	19.7	16.9	22.6
SADDLE MOUNTAIN	7940	2/27/89	64	20.8	16.8	22.0
SENTINEL CREEK	8300	2/28/89	62	18.5	15.2	20.1
SHORT CREEK	7000	2/23/89	21	4.5	3.2	--
SHOWER FALLS	8100	2/27/89	52	13.5	13.0	19.6
SHOWER FALLS PILLOW	8100	3/01/89	---	12.4	14.0	20.3
SILVER RUN	6630	2/28/89	17	3.1	2.1	5.0
SILVER RUN PILLOW	6630	3/01/89	---	4.3	3.7	5.4

SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-85
SKALKAHO PILLOW	7260	3/01/89	---	16.9	16.1	21.1
SKALKAHO SUMMIT	7250	2/27/89	64	16.4	18.2	22.7
SKYLARK TRAIL PILLOW	6200	3/01/89	---	28.4	24.7	27.9
SLAG-A-MELT LAKE	8750	2/25/89	58	18.2	13.2	22.5
SLIDE ROCK MOUNTAIN	7100	2/28/89	50	12.4	10.3	13.8
SMUGGLER MINE	6960	2/23/89	34	9.1	7.6	8.6
S.F. SHIELDS PILLOW	8100	3/01/89	---	12.1	10.3	15.1
S.F. SHIELDS	8100	3/01/89	68	16.4	14.6	20.6
SPOTTED BEAR MTN.	7000	2/24/89	41	12.6	9.8	13.7
SPUR PARK PILLOW	8100	3/01/89	---	15.9	13.6	19.0
SPUR PARK	8100	2/24/89	48	14.5	12.5	18.1
STAHL PEAK	6030	2/23/89	84	29.9	19.3	34.8
STAHL PEAK PILLOW	6030	3/01/89	---	27.6	16.7	31.7
STEMPLE PASS	6600	2/26/89	34	8.6	6.4	8.8
STORM LAKE	7780	2/28/89	44	10.2	8.6	11.0
STRYKER BASIN	6180	2/23/89	74	25.5	15.9	28.9
STUART MILL	6500	2/23/89	25	5.6	4.7	5.8
STUART MOUNTAIN	7400	3/04/89	83	27.9	20.4	28.1
SUCKER CREEK	3960	2/25/89	7	.6	.0	.4
TAYLOR ROAD	4080	2/25/89	16	3.6	2.8	3.4
TEN MILE LOWER	6600	2/27/89	29	6.3	5.4	6.5
TEN MILE MIDDLE	6800	2/27/89	36	8.6	7.5	9.7
TEN MILE UPPER	8000	2/23/89	38	10.4	9.7	11.8
TEPEE CREEK PILLOW	8000	3/01/89	---	10.4	7.6	11.5
TEPEE CREEK	8000	2/26/89	45	12.8	8.3	12.9
TIMBERLINE CREEK	8850	3/01/89	38	9.0	8.2	11.8
TRAIL CREEK	7090	2/25/89	29	7.1	5.2	7.0
TRINKUS LAKE	6100	2/24/89	93	34.1	28.7	37.9
TRUMAN CREEK	4060	3/08/89	26	7.0	2.6	3.8
TV MOUNTAIN	6800	3/04/89	54	15.3	12.4	16.3
TWELVEMILE PILLOW	5600	3/01/89	---	16.0	13.8	17.0
TWELVEMILE CREEK	5600	2/26/89	57	18.5	19.1	20.3
TWENTY-ONE MILE	7150	2/26/89	48	14.8	10.7	15.5
TWIN CREEKS	3580	2/24/89	30	9.5	8.6	11.2
TWIN LAKES PILLOW	6400	3/01/89	---	31.4	28.6	36.9
TWIN LAKES	6510	2/26/89	85	30.6	28.1	36.5
UPPER HOLLAND LAKE	6200	2/25/89	77	27.6	24.5	31.4
WALDRON PILLOW	5600	3/01/89	---	9.7	7.4	9.4
WALDRON	5600	3/01/89	36	8.6	5.4	9.2
WARM SPRINGS	7800	3/01/89	58	14.3	12.0	19.9
WARM SPRINGS PILLOW	7800	3/01/89	---	14.0	12.5	22.7
WEASEL DIVIDE	5450	2/23/89	75	26.8	18.0	30.5
WEST YELLOWSTONE	6700	2/26/89	39	10.4	6.4	10.7
WHISKEY CREEK PILLOW	6800	3/01/89	---	16.2	10.3	14.6
WHISKEY CREEK	6800	2/23/89	67	22.5	11.6	17.7
WHITE MILL PILLOW	8700	3/01/89	---	18.1	13.4	21.7
WHITE MILL	8700	2/27/89	70	23.2	17.2	23.9
WHITE PINE RIDGE	8850	2/26/89	22	4.6	3.7	4.5
WILLOW CREEK	6500	2/28/89	34	6.0	4.1	7.4
WOOD CREEK	5960	2/25/89	32	8.8	6.5	9.1
WOOD CREEK PILLOW	5960	3/01/89	---	8.3	5.9	9.5
WRONG CREEK	5700	2/24/89	36	8.8	8.6	12.5
WRONG RIDGE	6800	2/25/89	47	14.1	11.4	17.0

Valley Precipitation



Over 130%

110 - 130%

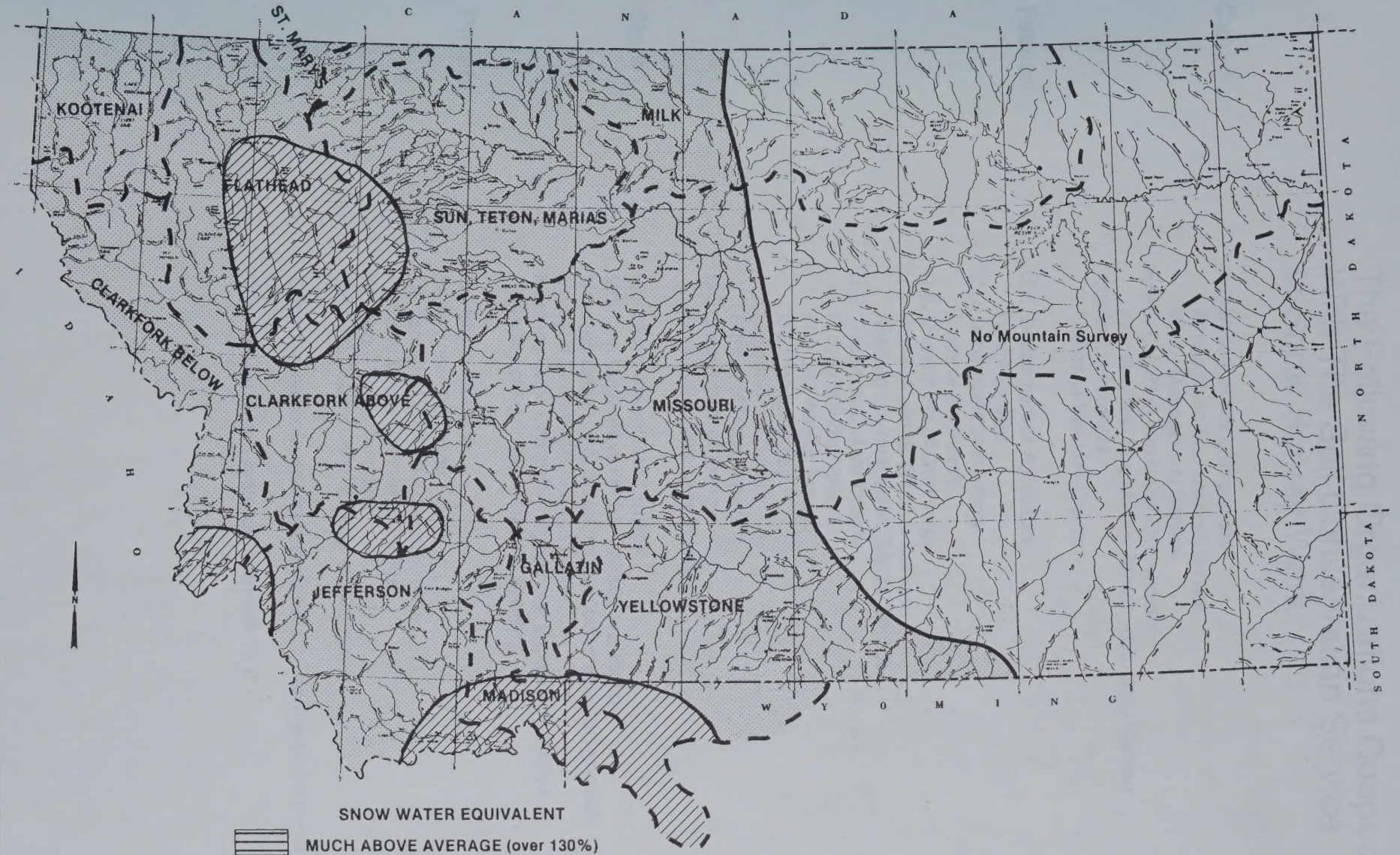
90 - 110%

70 - 90%

Under 70%

Source: NWS
Great Falls, MT

FEBRUARY 1989



MOUNTAIN SNOWWATER EQUIVALENT FOR MONTANA

SOURCE:
Information provided by SCS Snow Survey Personnel.

JUNE 1985 4-R-39296-1

The Following Organizations Cooperate With The Soil Conservation Service In Snow Survey Work

Canadian

Department of the Environment
- Atmospheric Environment Service
- Water Management Service

British Columbia Ministry of Environment
- Inventory and Engineering Branch, Hydrology Section

Alberta Environment
- Technical Services Division

Federal

U.S. Department of Agriculture
- Forest Service

U.S. Department of the Army
- Corps of Engineers

U.S. Department of Commerce
- NOAA, National Weather Service
- National Environmental Satellite Service

U.S. Department of the Interior
- Bureau of Indian Affairs
- Fish and Wildlife Service
- Geological Survey
- National Park Service
- Bureau of Reclamation

U.S. Department of Energy
- Bonneville Power Administration

State

Montana Conservation Districts
Montana Department of Fish, Wildlife, and Parks
Montana Department of Natural Resources and Conservation
Montana Department of State Lands
Montana State University - Agricultural Experiment Station
University of Montana - School of Forestry

Private

Big Sky of Montana
Butte Water Company
Confererated Salish & Kootenai Tribes
Flathead Valley Comminity College
Montana Power Company
Pondera County Canal & Reservoir Company

Other organizations and individuals furnish information for the snow survey reports.
Their cooperation is gratefully acknowledged.

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